Environment Canada Environnement Canada

Environment Canada and the North

Discussion Paper

July 1983

Canada

ENVIRONMENT CANADA AND THE NORTH

Minister
Environment Canada

Ministre
Environnement Canada

Release

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Date: July 16, 1983

For release: IMMEDIATE

ENVIRONMENT CANADA AND THE NORTH

FROBISHER BAY, N.W.T. -- Environment Minister John Roberts, today released a discussion paper entitled "Environment Canada and the North". The paper sets out Environment Canada's perceptions, roles and policies concerning the North and its development. It is intended to provide a basis for the territorial governments, other federal departments, interested organizations and citizens to review and comment on Environment Canada's northern policies and program activities.

Mr. Roberts indicated that the northern environment is one of the priority concerns he has directed his department to address during the 1980s and that this paper will serve to outline Environment Canada's contributions to northern environmental and resource management. The Minister emphasized, however, that views and suggestions are being solicited in order to identify ways in which Environment Canada can make a more effective contribution in the North.

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27/18/07/83 - 00080

ENVIRONMENT CANADA AND THE NORTH:

The Perceptions, Roles and Policies of the
Department of the Environment Regarding
Development North of 60°

Environment Canada
Ottawa, Ontario
K1A 1C7

Discussion Paper
July 1983

Issued under the authority of
the Hon. John Roberts, P.C., M.P.,
Minister of the Environment

Cat. No. En21-37/1983E
ISBN 0-662-12674-2

Cette publication peut aussi
être obtenue en français.

PREFACE

Rapid and fundamental change is occurring in Canada's North -- that vast area of the nation north of the sixtieth parallel comprising the Northwest and Yukon territories and the adjacent northern seas. Despite the economic difficulties currently facing Canada and the other nations of the global community, projections indicate that the recent changes in our North are only a prelude to even more pervasive transformations to come over the few remaining years of this century and beyond.

Much of the change is being precipitated by resource projects, recently undertaken or proposed, which focus on the development of the North's hydrocarbon, mineral and hydro-electric resource potential. Many of the projects are massive in scale and involve the application of state-of-the-art technology. They are being initiated just at a time when northerners themselves are taking actions that are leading to fundamental political and social transformations in the northern regions. Together, these initiatives will have profound, long-lasting effects on the political, economic and social evolution of Canada's northern territories. The North's resource use and demographic patterns will be altered markedly, as will its regional economies and administrative structures. As a consequence, major changes will occur in the opportunities and lifestyles open to northern residents.

The northern changes also have national significance. Resource development projects north of 60° will have a considerable impact on the national economy -- particularly on the degree of energy self-reliance Canada is able to achieve. Moreover, they offer the promise of a powerful stimulus for the nation's manufacturing, service and high-technology industries, and present the prospect of new jobs for southern Canadians. All Canadians, therefore, will be affected by the course of the northern enterprise.

While the resource development projects promise significant benefits, they have also raised many issues of public policy. Basic concerns are being expressed about the maintenance of environmental quality in the North, the conservation of the northern renewable resource base, and the rights and welfare of the North's native people. These and other fundamental concerns embrace a broad range of political, social, ethical, economic and environmental considerations. They pose basic questions about the values Canadians want to preserve and the objectives they wish to pursue in their north country. Developing wise responses to these issues presents a significant challenge.

But with the challenge also comes a major opportunity. We have an opportunity to chart a course for northern development that sees "things being done right" -- a course that provides an equitable distribution of the benefits and costs of development; a course that provides a basis for northerners, particularly the native people, to play a full role in shaping their destiny and to influence national affairs; and a course that guides resource use in ways that maintain cultural, environmental, and renewable

resource values for future generations. Canadians have the opportunity in their North to demonstrate, for themselves and other countries, concepts of development which ensure that the rights and welfare of all groups are respected, that development does not equate with the rape of the environment, and that "boom and bust" and its legacy are not the inevitable consequences of exploiting non-renewable resources. This is a unique and very real opportunity, for although the northern change that has occurred to date is dramatic, no strategic options for northern development have yet been foreclosed. Are we as citizens and governments prepared to seize this opportunity? In the interest of our own welfare and that of future Canadians, and world development programs generally, the only reasonable response must be "yes, indeed."

Because of its jurisdiction over the territories, the Government of Canada has a central role to play in ensuring a positive response to the northern opportunity. Under the leadership of the Department of Indian Affairs and Northern Development (DIAND) -- the agency responsible for coordinating all federal activities in the North -- the government has provided the overall direction for northern development through its formal policy statements. The essence of the government's position is expressed succinctly in the following statements:

> People, resources and environment are the main elements in any strategy for northern development.... the needs of the people in the North are more important than resource development and ... the maintenance of ecological balance is essential. In the setting of objectives and priorities in the North, in line with national policy goals, the essence of choice for the Government is to maintain an appropriate degree of balance among those three elements.[1]

> In the North, our national objectives are ... to achieve resource development at a rate and in a manner compatible with a delicate social and environmental balance, recognizing that northerners will play a growing role in both the decisions and benefits associated with that development.[2]

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1. Canada, Department of Indian Affairs and Northern Development, Canada's North: 1970-1980 (Ottawa: Information Canada, 1972), p. 6.

2. Canada, Department of Energy, Mines and Resources, The National Energy Program 1980 (Ottawa, 1980), p. 76. The government's policy position has been reaffirmed in more-recent announcements. See comments by the Hon. John Munro, Minister of Indian Affairs and Northern Development, in Canada, House of Commons Debates, 32nd Parliament, 1st sess. (19 October 1981), p. 11919; and Canada, Department of Energy, Mines and Resources, The National Energy Program: Update 1982 (Ottawa: Supply and Services Canada, 1982), p. 42.

Balanced development is the policy goal. As Canada's Minister of the Environment, I take this goal very seriously. It is my responsibility, my raison d'être, to foster harmony between society and the environment for the economic, social and cultural benefit of present and future generations of Canadians. Achieving this relationship between man and environment is a vital prerequisite, indeed the heart of the government's northern policy goal. To succeed -- to realize our northern opportunity -- it is essential that industrial development in the North function in harmony with the environment, pose minimal risks to life and property, and produce real net benefits for northerners. In the process it is also essential that the special environmental challenges presented by the North be fully considered and that the North's significant environmental values be properly protected.

DIAND has recognized the importance of resource and environmental management in meeting this goal. That department is developing a broad policy framework for northern resource and environmental management, taking into account the changing political, social and economic conditions in the North. I strongly support this initiative.

But maintaining the proper balance requires a concerted effort by all those in the private and public sectors who are engaged in the northern enterprise. In fact, all Canadians can play a role in seizing the northern opportunity. This can be done by becoming knowledgeable on northern issues and by participating in the forums and debates used to forge and test public policies for the North. Many citizens and groups have already taken up the challenge and are making constructive efforts to influence the course of northern development. However, to sustain and build on these initiatives, citizens require a considerable amount of information, much of which can only be provided by governments: information to understand the mandates and relationships of the many government departments and agencies that influence the course of northern affairs; information to keep abreast of northern policies as they evolve in response to changing circumstances; and information to assess the performance of government policies and programs against stated policy goals.

I am very conscious of these information needs, and of the important role a well-informed public can play in formulating and sustaining wise public policies and programs. A knowledgeable public and its support are particularly vital in mounting sound environmental policies. Without this support, it can be difficult to protect environmental values or to ensure that resource use decisions fully reflect a long-term perspective.

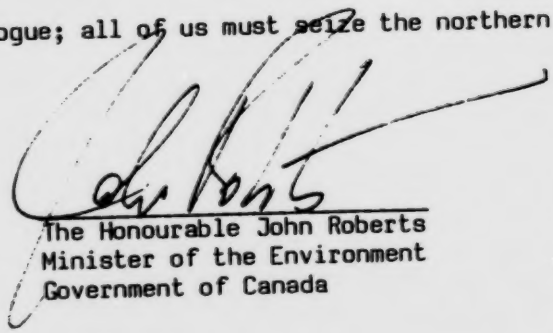
It was for these reasons that I requested the preparation of this discussion paper. The document is intended to serve two purposes. The first is to provide background information on Environment Canada's perceptions, roles and policies concerning the North and its development. The second is to provide a basis for interested organizations and citizens to review and comment on DOE's northern policies and program activities.

During the course of 1983, consultations on the positions and policies set forth in the paper will be requested with organizations that are directly concerned with the northern environment and its uses. Through these sessions, the department hopes to gain a better appreciation of the views of these organizations on the adequacy of DOE's northern policies and programs.

I am also most interested in obtaining the views and ideas of individual citizens -- particularly northerners -- on the approaches outlined in the paper. Therefore, I urge all Canadians who have the interest to send me their comments. Suggestions that have a potential for improving the policies governing environmental management in the North would be most welcome. Such ideas will be given serious consideration in the review and adjustment of the department's northern policies and program priorities and plans.

I am insisting that Environment Canada be a prime contributor to the achievement of environmentally sound, safe and sustainable development in our North. The northern environment is one of eight priority concerns I have directed my department to address during the balance of this decade. Action on the northern priority is being taken through the measures outlined in this paper. While I have confidence in these measures, I am sure that the views and suggestions being solicited will point to new ways through which Environment Canada can make an even more effective contribution in the North.

I look forward to the dialogue; all of us must seize the northern opportunity.



The Honourable John Roberts
Minister of the Environment
Government of Canada

July, 1983

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ENVIRONMENT CANADA AND THE NORTH

SUMMARY

The purpose of this publication is to outline the Department of the Environment's perceptions, roles and policies concerning development in that large area of Canada north of the sixtieth parallel.

I. The Administrative Context

The principal federal manager in the North is the Department of Indian Affairs and Northern Development (DIAND). DIAND has a broad mandate embracing all aspects of northern development. It formulates northern development policy recommendations for the federal government, coordinates all federal programs north of 60°, and administers most of the environmental and resource regulations that are applicable in the North. The achievement of northern policy objectives, however, requires other federal departments and agencies, and the territorial governments, to play important roles in the North. Thus, the Department of the Environment (Environment Canada), while not having an exclusive mandate for environmental affairs north of 60°, does have significant responsibilities concerning environmental and renewable resource management in the Canadian North.

II. DOE's Northern Roles

The Department of the Environment (DOE) has a general responsibility to advocate environmental interests, and to advise DIAND and other concerned government bodies on measures needed to protect and enhance the quality of the natural environment in Canada's North. In addition, it has a number of more specific northern roles. It is --

- A Researcher, responsible for developing knowledge on the northern environment and its renewable resources;
- A Resource Manager, responsible for managing parks programs, migratory birds and related conservation areas, the preparation of river basin plans, and the administration of pollution abatement and other regulations for which the Minister of the Environment is responsible;

- A Forecaster and Climate Advisor, responsible for providing meteorological, ice and sea-state forecasts and climate information;

- An Environmental Emergency Coordinator, responsible for ensuring that reporting and surveillance mechanisms for environmental emergencies are available and effective;

- An Environmental Auditor, responsible for monitoring environmental quality and the adequacy of environmental management and protection measures;

- A Science Advisor, responsible for providing environmental information needed in the design and regulation of industrial technology;

- A Policy Advisor, responsible for providing advice required to formulate environmental and renewable resource management policies;

- A Negotiator and Representative, responsible for supporting the negotiation of interjurisdictional agreements on transboundary environmental matters and representing Canada's environmental interests in international forums;

- An Advocate, responsible for promoting environmentally sound use of natural resources;

- An Educator, responsible for informing and consulting the public on the state of environmental quality, and for encouraging interest, understanding and continuing concern on environmental quality matters;

- An Operator of Northern Facilities, responsible for maintaining northern bases to support departmental programs and other northern operations.

III. Environmental Management Issues in the North

In recent years the pace of industrial activity has been accelerating in the North. With this acceleration has come a number of concerns regarding environmental quality in the North and the maintenance of the northern renewable resource base. Many of the concerns relate to potential problems that could arise if appropriate management measures are not introduced. The specific environmental issues of concern are not all of the same genre, nor are they easily classified into mutually exclusive categories. Generally speaking, however, they relate to one or more of the following subjects:

- Resource Use Policy
- Resource and Environmental Regulation
- Protection of Environmentally Significant Areas
- Maintenance of Species
- Transboundary Impacts and Responsibilities
- Arctic Shipping and Marine Oil Spills
- Transportation Corridors and Associated Impacts
- Safe Operations under Adverse Conditions
- Industrial and Community Wastes
- Forest Management and Fire Control
- Research and Monitoring

The issues associated with these subjects, and the actions required to address them have been considered by Environment Canada in formulating departmental policies and strategies to guide its northern program operations and environmental advocacy role.

IV. DOE's Northern Policies

Environment Canada's northern policies have been developed within the context set by its statutory mandates, the administrative structure and federal policies that govern the management of northern affairs, and its own departmental policies which are applicable throughout the nation. In addition, DOE has adopted a set of guiding principles on northern environmental management to guide its program activities in working towards its northern policy goal and objectives.

The Goal

Environment Canada's northern policy goal is to ensure that the department's programs and activities contribute efficiently and effectively to the protection and enhancement of environmental quality in Canada's North, and to the achievement of environmentally sound, safe and sustainable northern development.

Guiding Principles

Environment Canada pursues its policy goal through its northern program and advocacy activities while observing the following principles. The most general and overriding principle is that all dimensions of northern development must incorporate conservation concepts.

A number of more-specific principles flow from the general:

1. Northern development must be guided by approved and widely accepted plans which are aimed at balanced and sustainable development.

2. Essential ecological processes and life-support systems in the North must be maintained, and unique and significant northern ecosystems, species and cultural artifacts must be protected for posterity.

3. The risks to human life and property in the North must be minimized.

4. The true costs incurred in using the northern environment as a factor in the production of goods and services must, to the maximum degree possible, be borne by the users and reflected in the price of their goods and services.

5. Polluting discharges must be eliminated or controlled to minimize their effects, and financial responsibility for pollution abatement must be borne by polluters.

6. Northern resource use conflicts must be resolved in ways that advance the achievement of enhanced productivity and sustainable development.

7. Northern development proposals must be evaluated in terms of their economic, social and environmental costs and benefits; and the distribution of all costs and benefits must be carefully considered.

8. The cumulative and synergistic environmental effects of development activities must be considered in northern development planning.

9. Northern Canadians must have effective access to government information and decision-making processes concerned with northern development, and be allowed to play major roles in all dimensions of the development process.

10. Research on northern environmental systems and monitoring of environmental conditions must be undertaken, and the findings used in northern development planning and management.

11. Intergovernmental cooperation -- both domestic and international -- must be marshalled to deal effectively with transboundary environmental issues of significance in the North.

12. Education and information programs must increase public awareness of the conservation requirements in the North.

Policy Statements

1. **Environment Canada will promote the establishment of a comprehensive network of protected areas in the North to provide adequate protection and management for areas and sites of significance in the preservation of Canada's natural or cultural heritage, or in the provision of opportunities for public appreciation and enjoyment of the North's natural and cultural features.**

   DOE will pursue this objective through its own programs by --

   - completing the northern components of the national parks systems: national parks, national marine parks, national historic parks and sites, Canadian landmarks, Canadian heritage rivers, trails and areas;

   - providing adequate habitat protection for migratory birds and other species of federal interest through the creation and management of national wildlife areas, migratory bird sanctuaries and other habitat protection measures arranged jointly with other agencies;

   - maintaining an authoritative and up-to-date inventory of environmentally and culturally significant areas in the North;

   - participating in international forums concerned with conservation measures in the circumpolar region.

   DOE will use its advocacy role to --

   - promote the development of a comprehensive planning framework designed to identify, correlate and rationalize all proposals for the establishment of conservation and recreational areas in the North;

   - evaluate, with other agencies, the adequacy of present legislation and programs designed to provide proper protection and management of environmentally significant areas in the North and, if necessary, recommend legislation to establish a special ecological reserves program in the North.

2. **Environment Canada will promote environmentally sound technology and safe operations in northern resource exploration and development activities, in transportation and other infrastructure systems, and in community development programs.**

   DOE will pursue this objective through its own programs by --

   - providing technical information on northern environmental systems, and on pollution abatement measures needed for the design, operation and regulation of industrial technologies in the North;

- conducting research aimed at the development of better knowledge of the physical and biological characteristics and processes of northern environmental systems, the development of better measures for assessing and dealing with environmental impacts, and the development of pollution abatement technologies and practices appropriate for northern applications;

- providing vigorous, fair and consistent enforcement of regulations administered by the department, and providing advice and information to other regulatory bodies;

- providing weather, climate, ice and sea-state information, forecasts, and warnings in support of the safety of human life and property in the North, and promoting environmentally sound and economically efficient development.

Through its advocacy role, DOE will --

- promote better coordination among the regulatory agencies with responsibilities for northern environmental regulations, with the aim of simplifying the regulatory processes while still protecting the public interest.

3. **Environment Canada will encourage sustainable utilization of the North's renewable resources, sensible use of its non-renewable resources, and the resolution of transboundary environmental issues of concern in the North.**

DOE will pursue this objective through its programs and advocacy role by --

- actively supporting and contributing to the land use planning processes being established in the North;

- providing area-specific environmental guidelines and resource management criteria for northern regions; coordinating the preparation and implementation of water management plans for the Mackenzie and Yukon river basins (and other northern river basins, as appropriate); and conducting research and providing information on the present uses of northern resources and their environmental implications;

- conducting research, preparing management plans, and enforcing regulations for migratory birds and their habitats, and cooperating with other agencies in developing and implementing measures to sustain adequate populations of other species of federal interest;

- conducting research and providing advice on the management of northern forest fires, pests and diseases, on the commercial potential of northern forests, and on the characteristics and requirements of the vegetative components of northern ecosystems;

- assessing the broad environmental implications associated with alternative uses of non-renewable resources;

- providing timely advice on the use and management of the North's lands, waters, forests and wildlife to the responsible management and regulatory agencies;

- cooperating with other agencies in developing and implementing abatement measures to eliminate or significantly reduce transboundary airborne pollutants;

- engaging in research to assess the resource implications of climate change and variability.

4. **Environment Canada will increase the information available to Canadians on the state of environmental quality and resource use in the North, and facilitate public consultations on northern environmental management policies and programs.**

DOE will pursue this objective by --

- adhering to the department's policy on public consultation and information availability;

- improving the dissemination, particularly among northerners, of information on the state and trends of northern environmental quality and resource use;

- convening sessions on northern environmental topics at the department's national and regional consultation meetings. Special efforts are to be made to increase the number of regional meetings in northern communities;

- providing support for conferences and other sessions on northern environmental issues and encouraging the conveners of such sessions to hold meetings in northern centres;

- ensuring that the department's senior officers maintain effective liaison with northern organizations and leaders, and by establishing additional offices and locating more program personnel in the North as finances permit.

Commitments

In pursuing its northern policy goal and objectives, Environment Canada will --

- maintain the "northern environment" as one of the top priority concerns of the department during the course of the 1980s;

- ensure that its northern programs satisfy the positions and commitments made in the department's national policy statements, and in the government's policies pertinent to the North;

- consult and work cooperatively with other government bodies, industry, universities, northern native organizations and communities, environmental public interest groups, and other interested bodies, with the view of encouraging the development of a consensus and concerted effort in northern environmental management;

- undertake negotiations with other jurisdictions to develop formal agreements respecting the equitable utilization and protection of transboundary resources (air, water and wildlife) and represent the interests of Canadians in international activities related to sub-arctic and arctic environments;

- advocate the adoption by other government bodies of DOE's principles on northern environmental management, and its positions on planning, regulation and environmental research in the North;

- formulate departmental positions on northern development issues having significant environmental implications, and advocate the adoption of these positions by other government bodies with the view of encouraging sustainable, safe and environmentally sound development;

- employ its coordination and "horizontal" powers, including the provision of Cabinet-endorsed environmental guidelines, to influence or to direct government policies and programs in ways that advance the achievement of sustainable and safe northern development, and the maintenance of environmental quality in the North;

- provide access to the northern data and information produced by the department's core research and data collection programs;

- participate with other organizations in joint ventures serving commonly held or compatible northern objectives, and enabled by cost-sharing or work-sharing agreements approved by Treasury Board;

- encourage more intensive university training and research programs in the environmental sciences, with greater emphasis on northern environmental issues, and promote the allocation of higher funding levels for these endeavours;

- encourage the establishment of strong northern-based science centres, independent of federal government or industry direction, in order to foster the development of a capable community of northern scientists and the conduct of research on priority issues as defined by northerners;

- promote the active recruitment and training of native northerners, and encourage the application of their northern knowledge and experience in DOE's programs.

ENVIRONMENT CANADA AND THE NORTH

I. A SYNOPTIC VIEW OF CANADA'S NORTH

A National Heritage

1. Canada's northern territories -- the Yukon and Northwest Territories -- occupy almost 40 per cent of the nation's total land and freshwater area. Adjacent to this vast domain of over 3.9 million square kilometres lies an extensive marine area in which Canada claims ownership to the ocean bed and marine resources. The northern lands and seas join along coasts totalling over 160,000 kilometres in length, or about two-thirds of Canada's coastline. This huge area is characterized by great geographical diversity, climatic extremes and biological wonders.

2. Extensive boreal forests give way to treeless tundra on the sides of majestic mountain ranges and across the great expanse of the barrenlands. Long, dark winters and cool, nightless summers are dominant features of the North, as is persistent ice -- on the innumerable lakes, rivers and seas, in glaciers, and, less visibly, in the permanently frozen ground. The seas and straits provide vast fetches for strong winds which in winter drive abrasive snow and produce hazardous conditions. These same water bodies, in the period of perpetual light but frequent fog from June through August, exert a moderating effect on the North's brief summer. In combination, the physical characteristics limit the biological productivity of the land, and with it the size of the vegetative crop and the diversity of northern food chains. It is a harsh environment, but life does exist, both hardy and sensitive, on the land and in the waters. It is found in northern flora and fauna that are woven together in ecosystems that are unique in Canada and are replicated, if at all, only in other polar nations.[3]

3. Like the northern ecosystems, the story of man's experience in Canada's North presents a unique fabric. Its weave consists of epic tales of adventure, endurance, stunning failures and hard-won achievements.

4. The first chapters on the North's occupancy, told by the findings of archaeologists, take us back to prehistoric times. But the vivid imagery of the initial occupancy is captured best in the oral histories and cultures of Indian and Inuit Canadians whose ancestors first took up the challenge of

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3. Ecosystems are systems of plants, animals and micro-organisms, together with non-living components of the environment.

habitation in the North's demanding environment. Later chapters are told by the sagas of the Norsemen, and by the journals of the European explorers who sought the elusive Northwest Passage. The early commercial ventures are recorded in the journals of the seafarers who pursued the whale in arctic waters, and in the accounts of the fur traders who penetrated the vast interior waterways and barrenlands. Much of the early social history is found in the records of the missionaries who accompanied or followed the traders. In more recent times, the chapters documenting the northern enterprise multiply. They cover the adventures of the Klondike placer miners, northern activities of the Mounted Police and government scientists, the exploits of the entrepreneurs who have pursued the North's mineral and oil wealth, and the feats of military men and engineers. Adding colour to the story are the tales of boatmen, bush pilots, nurses, magistrates, weather observers, teachers, and many others who have participated in the northern enterprise.

5. This northern experience has contributed greatly to the national heritage and to the development of the Canadian identity. Of particular note are the contributions made by northern Indian and Inuit cultures in inculcating a sense of identity with the land, a sense of community, and a general appreciation of the broad scope of human adaptability. These cultures have also demonstrated the significant difference that exists between being part of the land as opposed to being mere possessors of it. This has been reflected by Indian and Inuit artists whose works have added unique qualities to the Canadian image at home and abroad. Other Canadian artists, writers and poets -- both northern and southern -- have also gained inspiration from the North and have given generous attention to it in the nation's literature and art. Underlying this attention is a fascination with the North's expansive, unique landscapes and with the constant theme conveyed by the northern occupancy record: a story about human ingenuity and perseverance in coming to terms with vast spaces and the harsh forces of nature, in the pursuit of livelihood, discovery and spiritual well-being.

But a Vast Expanse Seen Differently

6. To northern Canadians of Indian or Inuit ancestry, the northern expanse is not only a source of material sustenance; it is their cultural and spiritual homeland. Over many thousands of years their forefathers, through experimentation and experience, developed technology and lifestyles well suited to northern conditions. Native people became expert in coping with the severe constraints imposed by the North's physical regime and its biological vagaries. In the process, philosophies of life evolved that view man as an integral element of the natural environment. They see man and land as one entity, indivisible, governed by nature's laws. This relationship is sacred and central to the Indian and Inuit explanations of life's meaning. In rhythm with nature's repetitive cycles, these philosophies provide cohesiveness and continuity in native cultures. And they produce attitudes and value systems that differ markedly in many respects from those prevailing in the contemporary urban-centred society of southern Canada.

7. A different view was held by the European explorers, entrepreneurs and missionaries who first ventured into the northern expanse over 400 years ago. For them the North represented an opportunity to extend empire, gain new riches, save souls and serve their quest for a science-based knowledge of the world. Giving powerful motivation to this thrust was the philosophy of western man reared in the Judeo-Christian tradition, a philosophy which many of its sixteenth- to nineteenth-century adherents believed charged them with the right and duty to seek dominion over nature and other men in advancing their concept of civilization.

8. For modern-day Canadians participating in the mainstream of industrial and post-industrial society, the northern expanse brings forth other images. To some it is a frozen, barren and hostile space -- a place to be avoided. Others, like many of the earlier European entrepreneurs, consider it an immense storehouse of untapped resources -- a northern frontier to be exploited. Still others see it as an ecological and cultural treasure to be protected and preserved. These differing perceptions of Canada's North have generated much debate over the course of northern development.

9. This debate is not new; indeed, it is a part of our northern heritage. Recently, however, the debate has taken on a sense of urgency. This has occurred because over the last four decades, industrial man has finally developed the capacity to make major penetrations into the North -- penetrations that are generating sweeping change in all aspects of northern life.[4]

10. The traditional hunting, trapping and fishing economy of the North is being pushed aside or diversified. Mining enterprises have been established, some far north of the Arctic Circle. Tourism is expanding and is taking southern Canadians and foreign visitors to the far reaches of the Arctic. Exploration for hydrocarbons is being pursued vigorously in both onshore and offshore areas. Associated with all this activity are major infrastructure development projects, in place, under construction, or in their planning stages: air and marine transport facilities, and highways and pipelines that traverse vast distances. Rail transport is available from Whitehorse to Skagway on the Pacific, and railhead has reached Hay River on Great Slave Lake and the nearby Pine Point Mine. The Mackenzie Highway has given Yellowknife road access to the South, and is expected to extend down the Mackenzie Valley. Inuvik in the Mackenzie Delta area now has road access to Dawson in the Yukon and points beyond via the Dempster Highway. Each summer supply ships and barges regularly ply the Mackenzie River system and the arctic channels, and all-season marine navigation through part or all of the legendary Northwest Passage could well become a reality before the century's end. The nation is at the threshold of realizing a goal long-sought by some: the full mobilization of the North and its resources in the pursuit of national economic growth.

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4. Annex A contains a comment on the course and character of occupancy in Canada's North and points out some lessons to be learned from past settlement experiences.

Some Observations

11. The North, as a resource frontier, is being exploited as never before and poses great prospects for national economic development. But there are other observations to be made about the recent quantum jumps in the northern enterprise:

- Northern society and development are no longer self-sufficient. The new forms of occupancy and the associated settlements and lifestyles are highly dependent on goods, services, people and decisions from outside regions.

- A fundamental change is taking place in resource use. The traditional occupancy form, sustained solely through renewable resource use and making very low demands on energy resources, is being superseded. Most of the new developments are focused on the exploitation of non-renewables, and their energy demands are exceedingly high. Moreover, unlike the native people's traditional technology, the technology associated with the new enterprises has the potential, if used unwisely, to produce significant environmental damage, and to create major conflicts with renewable resource uses. Its unwise use can also put human life and property at risk.

- The trend towards specialization in large-scale resource production is increasing the exposure of the North's economy to the wide fluctuations that characterize national and international commodity markets. With this trend comes the increased risk of boom and bust.

- Northern society has become more complex and dynamic. Native peoples have not always fared well with the changes. The well-intentioned efforts aimed at improving their welfare have in some cases produced only disorientation. The dilemma is particularly pressing for many of the native elders and youths. There is the sadness of the old people whose family structure has been shattered and who cannot take part in the new life. There are the many youths who are torn between old and new ways, and who are frequently unequipped or unable to pursue either one effectively. Too many native citizens are reduced to alienation, idleness or worse.

Some Concerns

12. With the acceleration of the northern transformation has come the expression of many concerns and aspirations about the future course of northern development. They reflect the different perceptions of the North that exist in contemporary Canadian society.

- Inuit and Indian people are alarmed about the impacts the transformation is having on their traditional cultural links with the

land, on their resource base, and on their lifestyles. At the same time, they wish to realize the benefits in material well-being and career opportunity that the expected developments can bring. They want greater control over the decisions and events that directly affect them. In pursuit of these goals, the native people are seeking new roles in northern government, and are demanding a better definition and legal status for their aboriginal rights.

- The territorial governments see remote power centres, both government and corporate, dictating the course of northern events. Like the native people, they are seeking greater influence over the course of northern development. They are demanding greater levels of responsible government for themselves.

- Renewable resource managers are uneasy over the state of certain wildlife populations in the North. They note that mechanized transport and sophisticated weaponry have increased both the ability of hunters and the risk of devastation for key terrestrial and aquatic species. They also note the potential of industrial activity to damage wildlife habitat. Such concerns have given rise to demands for better wildlife conservation and habitat protection programs. Concern is also being expressed about the potential downstream effects of major hydroelectric developments and water-transfer schemes being proposed for some northward-flowing rivers. Better planning and water management in these interjurisdictional basins are being demanded.

- Naturalists express concern over the rapid industrial invasion of the relatively unaltered natural environments of the North. They state that knowledge of northern environmental dynamics is limited, and that the capacity to predict and control the environmental impacts of industry has not kept pace with technological innovations. Too rapid an industrial push without parallel commitments to environmental values could, they argue, create ecological damage of such severity that even the security of the global climate system may be threatened. Greater caution, improved environmental knowledge, security of tenure for environmentally significant areas, and environmentally sound industrial technologies are being demanded.

- Entrepreneurs engaged in the northern enterprise also have concerns. They see their activity not only as a quest for individual and corporate wealth, but also as an important contribution to regional and national economic growth and welfare. The technological challenge posed by their ventures is great. But it is not the only challenge encountered. In pursuing their goals, they find themselves enmeshed in debates with other groups which have different northern interests. The frustrations of these debates are compounded by regulatory systems which some developers believe are unnecessarily complex. The consequences are costly delays and uncertainty. Not surprisingly, some resource developers are calling for streamlined regulatory processes and the right to explore for resources wherever they are thought to exist in the North.

13. Each of these different concerns is real; however, no one citizen, organization or sector of Canadian society necessarily holds only one of the views expressed. Thus, Inuit and Indian Canadians, while having strong positions on their cultural and economic aspirations, may well share some of the other concerns described. Similarly, some entrepreneurs, while advocating expedient industrial development, may also be exponents of careful environmental management in their own and society's interests. And some northern politicians may want to pursue simultaneously, greater responsible government, the preservation of traditional ways, industrial development, and better natural resource management. These overlapping positions reflect the complexity of northern development and illustrate the need for clear, balanced and comprehensive policies to deal with the North's realities.

14. When these observations and concerns are viewed together, it is clear that the northern enterprise has taken firm hold and is generating all sorts of impacts and tensions. No longer are man and his activities insignificant specks in the northen expanse. The activities are expanding rapidly to fill the northern space. They are now overlapping and conflicting -- conflicting with each other at a growing pace, and at times with the basic ecological rhythm of the North.

15. The concerns described deserve careful consideration by Canadians. To ignore them is to run the risk of repeating old mistakes with consequences of even greater magnitude. But in our considerations, we must not become mesmerized by the problems. By doing so, we could miss the great opportunity the North presents as this century draws to a close: the unique opportunity to meet the northern development challenge in a constructive, cooperative and planned way that sustains and enhances quality and productivity. The alternative is not attractive; it is the ad hoc, reactive approach that could lead to a poorer country, economically and culturally, and could impose the burden of high costs in later years as attempts are made to correct serious social and environmental damage that might have been avoided.

II. ENVIRONMENTAL AFFAIRS AND THEIR ADMINISTRATION IN CANADA'S NORTH

Environmental Affairs and Government

16. Virtually all human activities produce impacts on the natural environment. Conversely, because man himself is a part of the biosphere, all dimensions of human experience are influenced by nature's biophysical forces. From an environmental perspective, everything is related to everything else. This elementary truism makes environmental affairs immensely complex for governments to deal with. Yet deal with them they must, for man-environment relationships are of a most fundamental kind; they largely determine the state of the human condition. The welfare of every human society is vitally linked to the quality of the natural environment. If environmental quality is diminished, so inevitably is the level of societal well-being in one, several or all of its dimensions: economic, social, physical or psychological.

17. Thus, governments are compelled to give serious attention to environmental affairs. But while environmental problems tend to be "horizontal," having many origins and generating far-ranging effects on many responsibilities and jurisdictions, government organization is "vertical," designed to deal with issues on a compartmentalized basis. These characteristics pose institutional challenges to all governments in designing, assigning and coordinating responsibilities for environmental affairs.[5]

Environmental and Resource Management in the North

18. The issues surrounding man-environment relationships and governments' response to them are particularly relevant in Canada's North. Here, the linkages between the realities of the environment and man's welfare and endeavours are very direct. Human life and property can easily be placed at risk, as can northern ecosystems. There is little leeway for error. If a desirable northern future is to unfold, harmony between man and environment must be the central theme and preoccupation that permeates all aspects of northern development. But creating and sustaining this harmony is no small undertaking. It requires careful attention to balance and pacing, and it

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5. Annex B contains a comment on the federal government's approach to the administration of environmental affairs.

calls for parallel commitments on several fronts and across a broad range of participants holding diverse interests. It is the federal government's responsibility to set legal and policy frameworks that are conducive to achieving this end.

19. The role of the federal government in resource and environmental management in the North is constitutionally broader than in the provinces. At the moment, the Government of Canada plays both "provincial" and "federal" roles in the North. Consequently, the number of acts of Parliament and of regulations governing northern resource development and environmental protection is relatively large. At present there are approximately thirty-five federal acts containing environmental provisions that apply in the North. In addition, the territorial governments have enacted ordinances bearing on environmental affairs; approximately ten such ordinances exist in each territory.[6]

20. At least nine federal departments and agencies, as well as the two territorial governments, are directly involved in the administration of northern resource and environmental legislation and regulations.[7] Not included in this number are special-purpose interdepartmental and intergovernmental coordinating committees, task forces, special agencies (such as the Northern Pipeline Agency), parliamentary committees, and native land claims negotiating teams, whose recommendations influence northern environmental and resource management.

21. It is a complex administrative structure; however, an overview of northern environmental management can be quickly gained by making a few general observations.

22. The principal federal manager in the territories is the Department of Indian Affairs and Northern Development (DIAND). North of 60°, the Minister of Indian Affairs and Northern Development exercises virtually all of the powers, duties and functions of a provincial government. DIAND is the "landlord" in all aspects of northern resource management. It largely determines how northern lands, waters, forests, minerals and hydrocarbons are to be developed. In carrying out its duties, it enforces most of the resource and environmental regulations applicable in the North. DIAND is

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6. The acts and ordinances that pertain to environmental and resource management in the North are listed in Annex C.

7. Departments
   - Indian Affairs and Northern Development
   - Environment
   - Fisheries and Oceans
   - National Health and Welfare
   - Energy, Mines and Resources
   - Transport

   Agencies
   - National Energy Board
   - Atomic Energy Control Board
   - Canada Oil and Gas Lands Administration

also responsible for formulating northern development policies for the government and for coordinating federal activities designed to achieve the policy objectives.

23. But, as previously noted, DIAND is not the only government body that performs on the northern stage. There are the territorial governments to which important mandates for local affairs and wildlife have been delegated. There are also a number of other federal departments and agencies whose programs influence the course of the northern enterprise. To be fully effective in pursuing the goal of balanced northern development, these programs, which are mandated under acts of Parliament for application throughout the country, must be tailored to meet the special conditions and policies bearing on the North. They must also be dovetailed with DIAND's programs, and with the activities of the territorial governments and the private sector. It is within this context that the Department of the Environment (DOE) must meet its responsibilities in the North.

Environment Canada's Northern Responsibilities

24. Environment Canada's principal preoccupation is with the preservation of the quality of Canada's natural environment.[8] DOE has the responsibility to provide the federal leadership and coordination necessary to pursue this objective. The government-wide coordination role assigned to DOE is analogous in some respects to DIAND's coordination function. Whereas DIAND coordinates all federal activities in the North, including resource and environmental management, DOE coordinates federal environmental affairs throughout the country, including the North. In its capacity as the federal government's environmental conscience and coordinator, Environment Canada is responsible for providing DIAND with policy and program advice and direction on all aspects of environmental quality preservation in the North.

25. DOE is also responsible for policies and programs dealing with forestry and inland water resources, wildlife, parks, meteorology, pollution control and several other subjects. These activities are mandated by the Department of the Environment Act and twelve other acts currently administered by the Minister of the Environment. The mandates provided by these acts, and the policies and programs that flow from them, are highly relevant to northern development.

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8. Annex D contains a summary of Environment Canada's mandates as provided by the Department of the Environment Act, a list of the other acts administered by the Minister of the Environment, and a listing of the department's objectives. It also provides a note on the northern contributions made by DOE's component services.

26. To fulfil its several mandates within the context of the North, Environment Canada plays a number of distinct northern roles. It is --

- A Researcher, responsible for advancing knowledge and providing scientific data on the components and processes of the atmosphere and biosphere, on northern renewable resource potentials and management requirements, and on technologies to serve environmental needs;

- A Resource Planner, Manager and Regulator, responsible for managing national parks, national historic parks and sites, migratory birds and migratory bird sanctuaries, and national wildlife areas; for fulfilling Canada's management obligations under international wildlife treaties; for coordinating the development of comprehensive plans for water management in the northern river basins; and for administering pollution abatement and other regulations promulgated under the acts administered by the Minister of the Environment;

- A Forecaster and Climate Advisor, responsible for providing meteorological, ice and sea-state forecasts and climate advice to safeguard human life and property, and environmental values, in northern industrial and transportation operations;

- An Environmental Emergency Coordinator, responsible for ensuring that a reporting and surveillance mechanism for environmental emergencies is available and that appropriate action is taken; and for coordinating the development of contingency plans and prevention activities for spills of oil and other hazardous materials;

- An Environmental Auditor, responsible for monitoring environmental quality and the adequacy of the environmental management and protection measures used by federal departments and agencies in their northern operations;

- A Science Advisor, responsible for providing science-based environmental information and advice needed in the design, operation and regulation of industrial technology, in order to achieve safety, efficiency and long-term economy, as well as to prevent damage to the northern environment;

- A Policy Advisor, responsible for providing advice and guidelines to define objectives and approaches for the government's northern environmental quality and renewable resource conservation policies and programs;

- A Negotiator and Representative, responsible for supporting the negotiation of interjurisdictional agreements that enable the resolution of transboundary environmental issues which affect the North; and for making representations in multilateral forums on Canada's circumpolar interests and views;

- An Advocate, responsible for promoting the sustainable use of renewable resources, the sensible use of non-renewable resources, and the protection of the North's natural and cultural heritage; and for recommending preventive or corrective actions to avoid serious environmental problems;

- An Educator, responsible for informing and consulting the public on the state and trends of environmental quality and resource management in the North; and for encouraging interest, understanding and long-term concern on northern environmental matters;

- An Operator of Northern Facilities, responsible for operating weather stations, parks and other facilities in the North which, in addition to serving their prime functions, provide important support to the community, transportation, communications and scientific infrastructure of the North.

27. This list shows that Environment Canada has a number of distinct and important northern roles to play. However, as the preceding outline of northern administrative arrangements indicates, DOE does not have an exclusive mandate for environmental affairs in the North. Many other government organizations are also involved. If totally effective environmental and resource management is to be achieved in the northern regions of Canada, these government bodies, industry and the involved publics must work in concert. The identification of the key environmental and resource issues in the North is vital to the mobilization of the necessary concerted effort. We now turn to these issues.

III. PRIORITY ISSUES AND NEEDS IN NORTHERN ENVIRONMENTAL MANAGEMENT

28. Environmental management is conditioned by social and institutional factors, some of which are currently in a dynamic state in Canada's northern territories. Many of the current northern policy issues focus on aboriginal rights and the status of territorial governance. Settlement of aboriginal land claims and adjustments in jurisdictional arrangements should see a number of these issues resolved.[9] These resolutions will mark important milestones in the North's political evolution.

29. But along with decisions on how ownership rights in resources are to be distributed or responsibilities for public administration assigned, innovative measures are required to ensure wise use and careful management of the North's resources and environment. There is an urgency in this task. The accelerating pace of the northern enterprise has brought not only new expectations, but also resource use conflicts, threats and some initial damage to northern ecosystems, regulatory regimes that breed uncertainty, and increasing debate over values and priorities. But the issues defined must not just focus on current problems. They must also encompass the opportunities for avoiding unnecessary social, economic and environmental costs in future years. The opportunities are to be found in a wide array of activities ranging from very specific activities such as vessel traffic management to broader tasks of environmental management such as dealing with long-term climate change and variability.

30. There are a number of issues that require attention. They are not mutually exclusive or of the same genre, and many relate to potential environmental problems which can be avoided provided appropriate preventive action is taken. The key issues concern --

- Resource Use Policy
- Resource and Environmental Regulation
- Protection of Environmentally Significant Areas
- Maintenance of Species
- Transboundary Impacts and Responsibilities
- Arctic Shipping and Marine Oil Spills
- Transportation Corridors and Associated Impacts
- Safe Operations under Adverse Conditions
- Industrial and Community Wastes
- Forest Management and Fire Control
- Research and Monitoring

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9. A major policy announcement concerning these issues was made by the Minister of Indian Affairs and Northern Development in November, 1982. See: "Constitutional Development in Canada's North," Communiqué 1-8227 (DIAND), 26 November 1982. Decisions arising out of the constitutional discussions on aboriginal rights could also have an important influence on northern environmental and resource management.

Resource Use Policy

31. Under the northern resource policies followed by successive Canadian governments from World War II to 1970, most of the North was open to all forms of resource use with few, if any, restrictions on development operations.[10] Priority was placed on instituting efficient procedures for granting licences to private interests in resources as a means of promoting economic development. Little attention was given to the side-effects of resource exploitation or to the implications of evolving resource use patterns. By the 1970s, this approach was clearly no longer satisfactory for guiding the accelerating northern enterprise; too many conflicts were emerging.

32. The initial response to emerging problems came in the early 1970s with the release of a comprehensive policy statement on northern development,[11] and the introduction of new regulations to increase control over resource exploration and development. Initiatives were also taken to establish new national parks in the North. But no measures were introduced to systematically assess and guide the changing resource use patterns. Resource use conflicts and environmental concerns grew as the decade progressed. By the end of the 1970s, it was recognized that formal systems of resource use planning were needed in the North, along with updated resource-sector policies to guide the planning effort. The federal Cabinet addressed the issue in July 1981, and ordered that land use planning systems be introduced in each territory under the leadership of DIAND.

33. There remains the considerable task of designing and implementing these systems. A related priority is the need to review and update sector policies on resource use and management in the North -- for example, the policies on northern inland waters, wildlife and forest management, and those on mineral and hydrocarbon development. In doing this, attention needs to be focused on developing measures to make more effective use of the North's renewable resources on a sustained-yield basis. This is particularly important for native peoples who wish to continue traditional lifestyles. Such measures will also encourage greater economic diversity and counter-balance the strong tendency towards concentration on a few large-scale developments of non-renewable resources.

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10. Annex E contains a comment on the evolution of resource use policy in the North.

11. Canada, Department of Indian Affairs and Northern Development, Canada's North: 1970-80 (Ottawa: Information Canada, 1972).

Resource and Environmental Regulation

34. During the last decade, many new regulations were promulgated under acts and ordinances administered by various government bodies in order to deal with northern resource and environmental issues. Each set of regulations was designed to deal with specific circumstances. Each has a solid raison d'être in protecting the public interest. But, in aggregate, the outcome has been a fragmented regulatory system that tends to be ad hoc and reactive in nature. The resulting complexity, delay and uncertainty are alarming both resource development and conservation interest groups. Developers generally accept the necessity of regulations to protect the public interest, but they demand that the rules of the game be clear and consistent.

35. Like the resource use issue, the problem of regulation points to the need for resource use planning systems. However, the regulation issue highlights a different aspect; the planning systems must do more than identify the most appropriate resource uses for specific northern regions. They must also supply resource management guidelines for northern areas -- guidelines that can serve as a reference base to guide the application of regulatory systems. Developing these management guidelines, and dovetailing the regulatory systems with the land use plans and management guidelines, represents another priority need.

36. Concerted effort is also required to improve the coordination among regulatory bodies, and to clarify the regulatory processes and procedures for industry and the affected publics. The objective must be to create administrative arrangements that are efficient, straightforward, yet comprehensive, and which produce effective and timely decisions on resource developments and operations.

Protection of Environmentally Significant Areas

37. Northern environments can be less forgiving than those of southern Canada. Disturbances of northern ecosystems persist for decades rather than years, and can have serious adverse effects. Animals and plants face severe conditions for survival in the North, and are highly vulnerable to man-induced disturbances. Once reduced in numbers, through habitat impoverishment or for other reasons, the wildlife populations may not be able to regain their former strengths; as well, serious reduction in the population of one species may seriously distort the ecosystem and have damaging consequences for other species.

38. Of particular concern is the protection of certain arctic "oases" where biological conditions favour unusually high wildlife concentrations. One such area is Lancaster Sound in the Eastern Arctic. It is frequented by approximately forty per cent of the North American population of beluga

whales, eighty-five per cent of the narwhal population, and one third of all the breeding seabirds in eastern North America. It also provides critical habitat for seals, walruses and polar bears. Another area at risk, the North Slope of the Yukon, is the calving ground for the Porcupine caribou herd. A third area, the Mackenzie Delta, is of great importance to furbearers, fish, and migratory birds. Moreover, the warm shallow waters of the adjacent Mackenzie Bay are critical for the calving of beluga whales. Serious disturbance of the biological conditions in these special areas will not only affect these areas themselves, but may have severe consequences for areas far removed from the disturbance.

39. Such special areas have global significance. This is recognized in the World Conservation Strategy, which identifies arctic Canada as a global priority area for the establishment of protected ecological areas.[12] At present, relatively few of these ecologically significant areas are formally protected and managed to sustain their environmental values. Unless action is taken soon, the accelerating pace of industrial development may preclude the protection of some of these important areas. A policy to ensure the continued biological health of such areas, and a significant extension in the network of protected ecological areas, are priority needs.

Maintenance of Species

40. The work of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) shows that four arctic and sub-arctic species are either threatened or endangered: Eskimo curlew (sandpiper), bowhead whale, peregrine falcon, and Peary caribou.[13] Populations of some other species have declined, are rare for the Canadian North, or are considered vulnerable. These include certain herds of barrenground caribou, muskox and walrus, and several seabird and raptor species. Controversy surrounds the question of who or what is responsible for declines in certain wildlife populations. The factors no doubt differ from case to case. Hunting is obviously a major factor in some declines, particularly in the areas close to, or readily accessible from northern communities. Other declines appear to be caused by contamination of habitats or industrial disturbance. Besides posing adverse consequences for the North's ecological integrity and gene pool, declines in marine and terrestrial wildlife populations will mean a decline in the hunting and fishing economies on which many northerners rely for food and employment. These declines must be arrested as a matter of priority.

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12. International Union for Conservation of Nature and Natural Resources (IUCN), World Conservation Strategy: Living Resource Conservation for Sustainable Development, prepared with the assistance of the United Nations Environment Program and the World Wildlife Fund (Gland, Switzerland: IUCN, 1980), map 3.

13. COSEWIC, "List of Species with Designated Status as of April 1983."

41. But the issue also has other dimensions. Priority attention must be given to improving the allocation of wildlife resources among appropriate uses and users. More effective wildlife management and better coordination amongst those with wildlife responsibilities are also required. These matters must be given high priority if northern species are to retain their diversity, resiliency and abundance. We must not forget our obligation to keep these species and their ecosystems in a healthy state for future generations.

Transboundary Impacts and Responsibilities

42. To a degree, Canada's northern environment can be understood and managed on a regional basis. There are, however, some northern environmental issues which require federal-provincial-territorial or international cooperation and action for their resolution. Among the most notable transboundary issues in the North are those concerning river systems, migratory species, the marine environment, and air quality. It is particularly important that Canada cooperate with its circumpolar neighbours in the development and exchange of scientific information needed to manage these emerging issues.

. Water Quantity and Quality

43. From time to time, development proposals are promoted that could affect rivers that flow across provincial-territorial boundaries or across the Yukon-Alaska border. These include:

- proposals to transfer water from the Peace and/or Athabasca rivers in Alberta to southern basins;
- proposed impoundments on the Liard River in British Columbia or on the Slave River in Alberta for hydroelectric generation;
- possible regulation of the flows from lakes straddling the British Columbia-Yukon boundary to provide storage for hydroelectric generation downstream on the Yukon River or for diversion into British Columbia;
- the establishment of tar sands and other mining operations in the headwater areas of northward-flowing rivers.

44. Such undertakings, pursued separately or in combination, could bring serious water quantity and quality problems to the territories unless their environmental implications are effectively dealt with in interjurisdictional forums. The damming of the Liard, for example, could alter the spring flood

on the Mackenzie River and thereby markedly affect the ecology of the Mackenzie Delta and the micro-climate in the Mackenzie Valley. Water quality in some northern rivers could be adversely affected by effluents produced in tar sand or mineral-processing operations.

45. Many of these are potential problems that can be avoided; others can be mitigated significantly through the preparation and implementation of comprehensive water-management plans for the river basins of concern. However, this requires concerted interjurisdictional action. Obtaining the formal intergovernmental agreements to enable and to pursue the necessary planning and implementation measures is another priority need in northern environmental management.

. Migratory Species

46. Certain northern species migrate across provincial-territorial or international boundaries. Consequently, several jurisdictions share these resources and the responsibility for their management. For example, the Kaminuriak and Beverly caribou herds migrate between the Northwest Territories and Manitoba and Saskatchewan. Some marine mammals and seabirds of Canada's Eastern Arctic frequent the territorial waters and shores of Greenland where they are important in local economies. Similarly, the Porcupine caribou herd and bowhead whale of the Western Arctic traverse the Canada-United States (Yukon-Alaska) boundary. Migratory bird populations that breed in Canada's North are shared with many other countries in North and South America, as they follow their long, and in many cases trans-hemispheric migration routes.

47. With each of these transboundary species, the welfare of the populations cannot be guaranteed by exemplary management practices of any one of the responsible jurisdictions acting independently. It requires concerted action by all the jurisdictions that share given species. A number of these species -- but not all -- are covered by interjurisdictional agreements that enable joint or multilateral management of the species populations. There still remains the task of negotiating treaties or agreements to enable interjurisdictional management and protection for some transboundary species (e.g., the Porcupine caribou herd). There also remains the task of preparing, updating and monitoring the transboundary management regimes needed to ensure the continuity of these important species.

. Northern Oceans Research

48. Many of the initiatives in northern hydrocarbon exploration are focused on offshore areas. These efforts, and any production activities that may follow, must cope with problems of sea-ice formation and movement -- particularly in the design, construction and operation of offshore

drilling and production platforms or artificial islands. Sea ice is also a major factor with under-sea pipelines and arctic shipping. Large investments by both industry and government are involved in these endeavours. Thus, a sound understanding of oceanographic conditions and a capability to produce long-term predictions of the severity and movement of sea ice in the Canadian Arctic are vital. The required knowledge and capabilities to deal with sea ice can only be developed through coordinated studies of the entire Arctic Ocean basin and North Atlantic regions -- especially of their oceanographic and climatic regimes. This, in turn, requires international cooperation. Canada has taken part, and must continue to participate in, international arctic marine and sea-ice studies.

. Air Quality

49. The circulation systems of the atmosphere are global in scope and transcend political divisions. Thus, airborne pollutants originating in one country are frequently transported by atmospheric circulation far beyond their country of origin. Such is the case with "acid rain" -- currently a major environmental preoccupation of many nations, including Canada. Much of the Canadian concern and debate over acid rain has focused on the effects it is having on aquatic and terrestrial ecologies in our central and eastern provinces. However, airborne pollutants are also present in western Canada and in the North, and their quantities appear to be increasing. There is, for example, the distinctive "arctic haze," the severity of which has been growing dramatically in the western Canadian Arctic over the last two decades. Its origin has been traced to industrial activities in other countries. Certain industrial activities in some provinces also produce emissions that result in the transport of airborne pollutants to our North. Much remains to be learned about the effects these pollutants are having on northern ecosystems. It is known, however, that a large portion of the North -- for example, the Canadian Shield -- is particularly vulnerable to acid precipitation.

50. Resolution of the air-pollutants issue requires action on a scale commensurate with the scale of atmospheric circulation. It requires inter-jurisdictional cooperation in research and mitigation measures. Obtaining agreements to facilitate these measures and vigorous multilateral and bilateral abatement programs are major environmental priorities.

Arctic Shipping and Marine Oil Spills

51. Arctic shipping is a venturesome activity requiring sophisticated and precise navigation systems. With it also comes the necessity to construct harbour facilities, frequently involving dredging to deepen

channels or to construct quays or artificial islands. Unless care is taken in selecting locations and designs for harbours and associated facilities, significant damage may ensue in estuarine areas where aquatic and terrestrial wildlife populations are concentrated.

52. The operation of ships and offshore facilities also poses a potential for environmental damage. Of particular concern are marine activities associated with oil exploration and production. Marine oil spills are almost always difficult to control and clean up. In arctic offshore areas, moving ice floes, icebergs, a cold and dark winter season, and the remoteness of operations pose added risks and problems. Once spilled in cold arctic waters, oil will not degrade quickly; it can remain along coasts and inside multi-year sea ice for many years. During this time, fish, seabirds, seals, polar bears and other species may suffer because of oil poisoning and the loss of food, habitat or body insulation. To protect these species, it is imperative that the risk of oil spills and of the spillage of other hazardous substances be minimized.

53. Marine operations may have other serious effects in northern waters. For example, concern has been expressed over the impact of industrial noises in the frequency ranges used by marine mammals such as whales, walruses and seals to communicate. Propeller and engine noise may drown out the signals used by animals to locate food or each other, or to avoid predators.

54. All these factors point to the need for a cautious and gradual approach to the application of marine industrial technology in the Arctic -- an approach in which environmental impacts are carefully assessed and mitigation measures are thoroughly tested before full operations commence. This is particularly true of proposals to initiate year-round shipping through ice-covered waters. Some of the effects on sea ice, climate and sea mammals can be foreseen, but others cannot be predicted with the knowledge presently available.

Transportation Corridors and Associated Impacts

55. Marine transport is not the only transportation mode that has environmental implications in the North. Land, inland water and air transportation modes also have their impacts. Roads and railways can adversely affect drainage patterns, and fish and wildlife habitats, if environmental design considerations are not incorporated in the planning for routing and construction. Moreover, with new rail lines and roads (like the Dempster Highway) comes ready public access to areas that were previously difficult to enter. This increased public access in turn increases the risk of disturbances to fish and wildlife. Similarly, river barge traffic and low airplane overflights may disrupt species during the critical times of breeding, calving and nesting.

56. The routing, construction and operation of oil and gas pipelines can also have a number of negative environmental impacts if precautions are not taken. Carefully designed guidelines and regulations are required to minimize the risks of pipeline breaks and spills, and, as in the case with road and rail, to prevent erosion and to minimize disturbance of permafrost and of wildlife populations and their habitats.

Safe Operations under Adverse Conditions

57. Major strides are being made in extending the networks of all transportation modes far into the North. However, the nodes in these networks are still relatively few and far between. Long distances must be travelled through sparsely populated or uninhabitated areas; in case of trouble or accident, assistance may be long in arriving. There are also the hazards of sudden storms and floods, frequent and sometimes persistent fog, contrary winds, ice jams on rivers, washouts and snow drifts on roads, the problems posed by sea ice and permafrost, and the threat of ice build-up on aircraft and ships. As well there are the long, dark and extremely cold winter and the hazardous break-up and freeze-up seasons. Separately or in combination, these factors pose major challenges to northern transport operations throughout the year.

58. With such conditions, the safeguarding of human life and property must be a major preoccupation. Achieving the necessary levels of safety in transportation is very much dependent on the provision of reliable systems to predict environmental conditions, on the existence of good navigation aids and systems, and on the operation of effective communication -- and where justified, traffic control -- systems. Because of increasing traffic, there is a need for improvements in the environmental prediction and other support systems to provide information at a frequency and of a quality required to ensure safe transport operations in the North. This is also important from the perspective of environmental quality. By reducing the risks of accidents, pollution risks are also reduced.

Industrial and Community Wastes

59. Some mining operations produce toxic wastes which, unless properly contained and treated, pose threats to human health and to aquatic and terrestrial ecosystems. Such threats occur when radioactive elements, arsenic, cyanide and other toxic by-products are permitted to enter rivers, lakes or shore areas either directly, or indirectly through tailings ponds. Community wastes can also pose threats to human health and the natural environment unless properly managed. Considerable progress has been made in recent years in the containment and management of hazardous wastes. However, vigilance is still required to contain these pollutants, and the

design and operation of new northern mines and communities must incorporate measures to manage hazardous materials effectively. Continued effort is also required in improving the adaptation of waste treatment technology to northern conditions -- especially low temperatures and permafrost.

Forest Management and Fire Control

60. Relative to the vast tracts of boreal forest in the territories, the total commercial volume of the northern forest is limited. Low growth rates and remoteness are responsible for this limitation. There is a northern forestry industry -- a small, but regionally important part of the national forestry sector. It focuses primarily on local markets, although it is an important supplier of tree seeds to international markets.

61. Forest fires, and to a lesser extent pests and diseases, are disruptive to northern forestry operations.[14] However, the consequences of these agents, especially of fire, go beyond commercial forestry concerns. Northern forest fires can cover extensive areas. In the process they destroy furbearers and their habitat, as well as associated trap-lines. They also destroy or disturb other animals. The consequences can be very severe for hunting, trapping, tourism and recreation activities -- all of which have economic and social importance in northern Canada.

62. These fires also pose hazards for northern communities, transportation facilities, and remote resource development and tourist camps. Significant economic losses and social disruptions are incurred when fire sweeps through these nodes of human activity.

63. The area in which northern forest fires can occur is vast. In any fire season there can be a large number of fires, many of which are very extensive, and often in remote locations. It is not feasible, nor necessarily desirable from an ecological standpoint, to stamp out all northern fires as soon as they are detected. Forest fire management must, therefore, be based on a selective approach to fire-fighting. Arriving at sound decisions on when to fight fires requires a good understanding of northern forest ecology, as well as the economic and social investments and values involved.

64. Knowledge of northern vegetative ecology is also required in planning regeneration after fire or harvesting, in controlling forest pests and

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14. Forest fire from natural causes plays an important role in ecological dynamics. The same can be said for forest pests and diseases that are indigenous to particular ecosystems. But these agents can be highly disruptive to human activities. Each year, Canada suffers significant losses of commercial and other forests through fires caused by nature or man, as well as through the ravages of forest insects and diseases. The challenge of skilful management of forest resources lies in controlling fires and pests so that they do not unduly disrupt human use of the resource, without at the same time inadvertently weakening the overall forest system by removing these natural cleansing agents.

diseases, in assessing the potential environmental impacts of proposed development projects, in land use planning projects, and in research on climate change. As northern development proceeds, we must ensure that the advances in our knowledge of northern vegatation dynamics, and in our forest management capabilities keep pace; otherwise, serious losses reaching far beyond immediate commercial forestry interests could result.

Research and Monitoring

65. Traditionally, northern environmental science has been dominated by federal government programs. In the last decade, however, there has been a significant increase in industry's northern science effort. During the same period, government budgets for northern scientific work were constrained, resulting in little or no real growth in government's northern science effort.

66. The manner in which industry is addressing its responsibilities on northern environmental matters is most encouraging. Current designs for many northern industrial projects reflect a high degree of environmental planning. However, these worthy efforts by industry have created a relative imbalance in the overall scientific effort in the North -- an imbalance that only government can correct.

67. Industry's scientific work in the North is concentrated on applied research aimed at specific problems that must be solved to advance industrial enterprises. The major strides industry is making in these research activities has created a relative lag and neglect in the study of the basic physical and biological processes of the North's environment. And it has highlighted the increasing need, as yet unmet, for scientific overviews and syntheses of northern environmental knowledge. These overviews and syntheses are required to formulate sound management and protection policies. Without them, it is becoming increasingly difficult for government agencies to assess industry's environmental research conclusions.

68. The government's scientific data bases are frequently inadequate or non-existent, and insufficient numbers of qualified scientific personnel exist to interpret industry's research methods and conclusions. In some cases, industry's data bases and interpretations constitute the only information available for government decision-making. These circumstances can lead to serious delays and uncertainties that create problems for both industry and government.

69. If balanced development is to be achieved in the North, government's northern science programs must keep pace with the accelerating pace of northern industrial activity. A much greater effort is required in basic research on the North's environmental systems and in environmental monitoring to test hypotheses and to assess the actual environmental effects

of industrial activity in the northern environment. Well-conceived research, intelligence and monitoring programs are also required by both government and industry to permit timely responses to unforeseen impacts.

70. There is also a need to encourage northern environmental research that is independent of both government and industry -- research by local northern institutions and by the academic community, according to their own perceptions, priorities and initiatives. The growth of such independent research, in the North as in the rest of the country, together with active, close links with northern and polar research undertaken by other countries, is the best way to ensure good and creative science, and the development of capable northern-based scientists.

IV. PRINCIPLES

Shared Responsibility

71. The issues enumerated in the previous section illustrate the wide-ranging and complex nature of environmental management challenges in the North. However, by meeting the priority needs that have been identified, significant progress can be made towards the achievement of balanced development.

72. The needs cannot be met by any one organization working alone. Meeting them requires concerted action involving high levels of cooperation among many organizations. For this reason, it is critically important that all organizations and groups with responsibilities or interests in the North be explicit in stating their positions on the future course of the northern enterprise. They must be prepared to share their views and to work together in developing common understanding and agreement on the northern development strategies and tactics to be pursued. Only in this way can consensus be built -- consensus that is essential for mounting and sustaining the concerted effort required.

73. With this in mind, the balance of this paper is devoted to a description of Environment Canada's positions on northern development. The positions are based on the perceptions recorded in the previous sections of the paper, and are presented in the form of statements on guiding principles and policy.

Guiding Principles

> Human beings, in their quest for economic development and enjoyment of the riches of nature, must come to terms with the reality of resource limitations and the carrying capacities of ecosystems, and must take account of the needs of future generations.[15]

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15. International Union for Conservation of Nature and Natural Resources (IUCN), World Conservation Strategy: Living Resource Conservation for Sustainable Development, prepared with the assistance of the United Nations Environment Program and the World Wildlife Fund (Gland, Switzerland: IUCN, 1980), Preamble and Guide, p. 1.

74. This quotation succinctly expresses the essential aim of environmental management: the development of harmonious relations between human society and its natural environment. In approaching this aim and its northern responsibilities, Environment Canada is guided by the federal government's northern policy, and by its own departmental policies, which are applicable across the nation.[16] In addition, the department has adopted a number of principles on northern environmental management to ensure that its northern roles and programs are founded on sound ecological, social and economic perspectives. These principles are derived from the department's national policies,[17] and express DOE's basic attitudes towards northern development.

75. The most general and overriding principle is that all dimensions of northern development must incorporate conservation concepts. "Conservation" is defined here as the management of human use of the biosphere, atmosphere and lithosphere so that they yield the greatest sustainable benefit to present generations while maintaining their potential to meet the needs and aspirations of future generations. So defined, conservation is positive and dynamic, embracing preservation, maintenance, sustainable utilization of renewable resources, the sensible use of non-renewable resources, and the restoration and enhancement of the natural environment and its processes.

76. A number of more-specific principles flow from the general:

1. Northern development must be guided by approved and widely accepted plans which are aimed at balanced and sustainable development.

2. Essential ecological processes and life-support systems in the North must be maintained, and unique and significant northern ecosystems, species and cultural artifacts must be protected for posterity.

3. The risks to human life and property in the North must be minimized.

4. The true costs incurred in using the northern environment as a factor in the production of goods and services must, to the maximum degree possible, be borne by the users and reflected in the price of their goods and services.

5. Polluting discharges must be eliminated or controlled to minimize their effects, and financial responsibility for pollution abatement must be borne by polluters.

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16. For example, DOE policies on environmental quality, national parks, and -- in the near future -- on renewable resources conservation and human adaptation to the natural environment, will have a bearing on the department's work in the North.

17. A summary of the principles adopted by DOE in fulfilling its mandate is provided in Environment Canada, "Departmental Strategic Plan, August 1982."

6. Northern resource use conflicts must be resolved in ways that advance the achievement of enhanced productivity and sustainable development.

7. Northern development proposals must be evaluated in terms of their economic, social and environmental costs and benefits; and the distribution of all costs and benefits must be carefully considered.

8. The cumulative and synergistic environmental effects of development activities must be considered in northern development planning.

9. Northern Canadians must have effective access to government information and decision-making processes concerned with northern development, and be allowed to play major roles in all dimensions of the development process.

10. Research on northern environmental systems and monitoring of environmental conditions must be undertaken, and the findings used in northern development planning and management.

11. Intergovernmental cooperation -- both domestic and international -- must be marshalled to deal effectively with transboundary environmental issues of significance in the North.

12. Education and information programs must increase public awareness of the conservation requirements in the North.

77. In addition to using these principles to guide its own approaches to northern development, Environment Canada advocates their adoption by other government bodies whose policies and programs influence the course of the northern enterprise. Adherence to the principles will mark an important step towards the attainment of balanced development.

Additional Positions

78. Two key factors in the achievement of balanced, safe and sustainable development are planning and regulation. Many of the current problems in northern environmental management can be resolved, and potential ones avoided, through the application of these processes. However, to be effective, the planning and regulatory processes must, in Environment Canada's view, be based on canons of justice; deal with market externalities and other social, economic and environmental factors; consider both the short and long term; and be conducted efficiently and effectively. Because these two processes have strategic importance for northern development, Environment Canada has developed detailed positions on certain planning and regulatory activities that are particularly relevant to environmental management. These positions are outlined in Annex F. They deal with land use planning, protected-area planning, the regulation of industrial activity in the North, and northern scientific research relevant to planning and regulation.

V. POLICIES

DOE's Northern Policy Goal

79. Environment Canada's northern policy goal is --

> to ensure that the department's programs and activities contribute efficiently and effectively to the protection and enhancement of environmental quality in Canada's North, and to the achievement of environmentally sound, safe and sustainable northern development.

80. Simply stated, the term "policy" refers to decisions concerning objectives to be achieved and the means of achieving them. Environment Canada has established four objectives to give direction to its northern programs in pursuing the policy goal. It has also made some broad commitments and has formulated strategies to focus its programs on these northern objectives. In doing this, the factors, issues, principles and positions presented in the foregoing sections of this paper have been considered.

Northern Objectives

81. The four northern objectives adopted by Environment Canada are directly linked to the priority needs in northern environmental management. They are:

1. to promote the establishment of a comprehensive network of protected areas in the North to provide adequate protection and management for areas and sites of significance in the preservation of Canada's natural and cultural heritage, or in the provision of opportunities for public appreciation and enjoyment of the North's natural and cultural features;

2. to promote environmentally sound technology and safe operations in northern resource exploration and development activities, in transportation and other infrastructure systems, and in community development programs;

3. to encourage sustainable utilization of the North's renewable resources, sensible use of its non-renewable resources, and resolution of transboundary environmental issues of concern in the North;

4. to increase the information available to Canadians on the state of environmental quality and resource use in the North, and facilitate public consultations on northern environmental management policies and programs.

Commitments

82. In pursuing its northern policy goal and objectives, Environment Canada will --

- maintain the "northern environment" as one of the top priority concerns of the department during the course of the 1980s;

- ensure that its northern programs satisfy the positions and commitments made in the department's national policy statements, and in the government's policies pertinent to the North;

- consult and work cooperatively with other countries, other federal departments and agencies, the provincial and territorial governments, industry, universities, northern native organizations and communities, environmental public interest groups, and other interested bodies, with the view of encouraging the development of a consensus and concerted effort in northern environmental management;

- undertake negotiations with other jurisdictions to develop formal agreements respecting the equitable utilization and protection of transboundary resources (air, water and wildlife) and represent the interests of Canadians in international activities related to sub-arctic and arctic environments;

- advocate the adoption by other government bodies of DOE's principles on northern environmental management, and its positions on planning, regulation and environmental research in the North;

- formulate departmental positions on northern development issues having significant environmental implications, and advocate the adoption of these positions by other government bodies with the view of encouraging sustainable, safe and environmentally sound development;

- employ its coordination and "horizontal" powers, including the provision of Cabinet-endorsed environmental guidelines, to influence or to direct government policies and programs in ways that advance the achievement of sustainable and safe northern development, and the maintenance of environmental quality in the North;

- provide access to the northern data and information produced by the department's core research and data collection programs. At the request of individual clients and with the approval of the Treasury Board, DOE will provide special northern research and data collection programs on a cost-recovery basis;

- participate with other organizations in joint ventures serving commonly held or compatible northern objectives, and enabled by cost-sharing or work-sharing agreements approved by Treasury Board;

- encourage more intensive university training and research programs in the environmental sciences, with greater emphasis on northern environmental issues, and promote the allocation of higher funding levels for these endeavours;

- encourage the establishment of strong northern-based science centres, independent of federal government or industry direction, in order to foster the development of a capable community of northern scientists and the conduct of research on priority issues as defined by northerners;

- promote the active recruitment and training of native northerners, and encourage the application of their northern knowledge and experience in DOE's programs.

Strategies

83. While statements of objectives reveal what is to be accomplished, statements of strategy are required to give direction on how the objectives are to be achieved within a programmatic framework. Environment Canada has formulated four strategies to parallel its four northern objectives. The elements of each strategy are summarized below.

THE STRATEGY FOR ESTABLISHING A COMPREHENSIVE NETWORK OF PROTECTED AREAS IN CANADA'S NORTH

84. This strategy is designed to provide appropriate protection and management for northern areas having natural or cultural significance, before important conservation options are precluded by industrial development.[18] The strategy calls for Environment Canada to --

- actively pursue, as a matter of top priority, the completion of the national park systems in the North. On the basis of present information and plans, it is believed that in total, fifteen national terrestrial parks and at least three national marine parks are required to represent

18. Annex F outlines in greater detail DOE's approach to protected-area planning (see p. 64 below).

adequately the North's natural regions. To date, four terrestrial parks have been established north of 60° (Wood Buffalo National Park, and three national park reserves: Kluane, Nahanni and Auyuittuq); in addition, three land withdrawals for park purposes have been made through orders-in-council. There remains the task of setting aside the areas for the establishment of the remaining eight terrestrial and three marine parks, as well as the task of completing the identification and designation of Canadian landmarks to protect significant cultural and natural sites in the North;

- actively pursue the protection of significant wildlife habitats in the North through the establishment of national wildlife areas, migratory bird sanctuaries, and other habitat protection arrangements developed jointly with other agencies. The initial priority is the establishment of national wildlife areas to protect significant wildlife habitats identified by DOE's Northern Conservation Lands Inventory and by other programs such as the International Biological Programme (IBP) which has identified 140 sites of ecological significance in Canada's North;

- pursue the preservation of cultural and historic artifacts, and the commemoration of historic events in the North, through the establishment of national historic parks and sites;

- pursue the identification of appropriate northern rivers, trails and areas for inclusion in the Canadian Heritage Rivers and Trails programs and the Cooperative Heritage Areas Program, and arrange for their management through joint undertakings with DIAND and the territorial governments;

- maintain the DOE Northern Conservation Lands Inventory as an authoritative and up-to-date inventory of northern areas having natural and cultural values of Canadian significance. In addition to serving DOE's own programs, the inventory is to serve as an aid in consultations with other organizations in developing the comprehensive action required to ensure that all important conservation and recreational area needs are met in the North;

- evaluate, in consultation with DIAND, the Department of Fisheries and Oceans (DFO), the territorial governments and the Canadian Council on Ecological Areas, the adequacy of present legislation and programs regarding the protection and management of environmentally significant areas in the North; and if deemed necessary, recommend legislation to establish a special ecological reserves program in the North;

- join with DIAND, DFO and the territorial governments in providing the leadership and coordination required to establish and maintain the planning framework needed to rationalize all proposals for conservation and recreation areas in the North, and to expedite action by all responsible agencies in establishing an appropriate network and management regime covering the key conservation and recreation areas north of 60°;

. cooperate with other countries in the establishment of protected areas in northern regions that will help preserve and manage sites and habitats that are critically important to circumpolar and international cultures, and terrestrial and aquatic species and ecosystems.

THE STRATEGY FOR PROMOTING ENVIRONMENTALLY SOUND TECHNOLOGY AND SAFE OPERATIONS IN NORTHERN DEVELOPMENT

85. Environment Canada operates the national climate, weather, ice and sea-state information systems and services; it conducts research on the atmosphere and biosphere; and it assesses and develops management systems and technology for handling toxic substances and other pollutants. It also provides technical advice to other agencies with regulatory roles, is an environmental regulator in its own right, and operates important scientific data-gathering, communications and logistical facilities north of 60°. All these roles are highly relevant to the promotion of environmentally sound technology and its safe operation in the North.

86. The goal of the strategy is to ensure that DOE research, information, regulatory and advisory services relevant to the objective are forthcoming in an effective and efficient manner. In formulating the strategy, it was recognized that hydrocarbon development and its associated transportation requirements will pose the greatest challenges during the 1980s with regard to the application of new technology.

87. The strategy calls for Environment Canada to undertake a range of activities in relation to technical information services, research, and regulatory and advisory services.

Technical Information Services[19]

The department will --

. provide a core program of climate, weather, ice and sea-state information and forecasting services to meet local and regional needs in the

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19. Annex G contains a note that describes policies covering the provision of environmental baseline information under "core" and "special" data generation programs.

North. When demand warrants, and with the approval of Cabinet and Treasury Board, DOE will upgrade the core program to monitor ice and sea-state conditions throughout the year. Currently, these conditions are monitored in the North during the summer months only;

- provide, with Treasury Board approval, meteorological, ice and sea-state information and forecasting programs designed to serve individual client needs. These special-program services are provided on a cost-recovery basis;

- provide appropriate access to the environmental baseline information produced by the department's core data-generation programs concerned with terrestrial and aquatic environments and their uses (e.g., hydrometric surveys, water and air quality monitoring programs, wildlife habitat surveys, wildlife censuses, vegetation studies, ecological land evaluations, land use surveys);

- provide accelerated environmental baseline studies as special programs undertaken in response to demands by clients. These programs are operated on a cost-recovery basis;

- provide information for use in designing waste-disposal systems, and in managing hazardous substances.

Research

The department will --

- develop improved means for identifying and measuring environmental impacts, preparing and conducting reviews of environmental impact statements, monitoring environmental conditions and processes, mitigating adverse environmental effects, and containing and cleaning up pollutants in the North -- particularly spills of oil and other hazardous substances;

- develop a better understanding of the susceptibility of wildlife populations to northern industrial developments in order to ensure that regulations with respect to wildlife provide for adequate protection from human impacts and disturbance and also for optimum sustained use of such resources;

- develop better knowledge on northern meso- and micro-climates, and formulate sea-ice and iceberg climatologies in order to increase the accuracy of weather, ice and sea-state forecasts; provide air quality impact assessment techniques; predict the behaviour of waves and oil spills in arctic waters, and of vapour clouds caused by spills of

liquefied natural gas; and provide aid in the selection of marine shipping routes, in the design of ships and offshore structures, and in the siting and design of land-based transportation facilities and new settlements, taking into account weather, sea-ice and biological factors;

- develop better knowledge on permafrost and northern river regimes, and on the sensitivity of terrestrial and aquatic ecosystems and species in the North, in order to provide improved predictions of terrain and river stability and ecosystem resiliency, and to facilitate the incorporation of environmental considerations in engineering designs;

- develop environmental design guidelines for the application of industrial technology in northern environments; codes of good practice for air, water and marine pollution control in the North; and criteria and appropriate technology for the collection, transport, storage and disposal of wastes in northern operations;

- undertake special studies, as required, to identify and compare the environmental risks and costs associated with alternative means of achieving development goals (e.g., comparative analysis of the marine transport mode and the overland pipeline mode for shipping northern oil to markets);

- develop, in association with DIAND and other regulatory bodies, appropriate means to simplify and clarify northern environmental and resource regulatory regimes, while ensuring protection of the public interest;

- participate with other countries in cooperative or parallel research programs to increase the understanding of arctic conditions, processes and resources as a whole, in order to provide a broader base for Canada's northern policies and to enable Canada to contribute to international cooperation among northern nations in solving shared problems;

- involve northerners in the design and conduct of its northern research programs and projects.

Regulatory and Advisory Services

The department will --

- provide vigorous but just enforcement services to ensure compliance with the regulations administered by DOE. This requires that regulations and the terms and conditions associated with them be clearly stated, effectively disseminated among the affected publics, and enforced in a consistent manner;

- provide government regulatory agencies with timely advice and positions on the environmental implications of technology applications in the North. This is done through DOE membership on committees concerned with northern development (e.g., the Environmental Advisory Committee on Arctic Marine Transportation, which provides advice to the Canadian Coast Guard; the Interdepartmental Environmental Review Committee, which provides advice to DIAND on terms and conditions for various regulatory permits; and the territorial water boards and land use advisory committees, which deal with water use and land use permits);

- provide advice and departmental positions on northern development proposals at hearings convened by environmental assessment review panels, regulatory agencies, or parliamentary committees;

- provide federal ministers with policy advice concerning the environmental implications of various alternatives available in charting the course of northern development.

88. An important tactical measure has been taken to carry out the elements of this strategy with respect to northern oil and gas development. Hydrocarbon development activity is at a high level in the North, particularly in the Beaufort Sea region. If managed unwisely, industrial development in this area could produce serious environmental problems. Avoiding these problems requires close liaison and coordination within and between government and industry. Environment Canada has taken a special measure to ensure that it performs all its roles effectively in relation to northern hydrocarbon exploration and production. It has established a DOE Beaufort Sea Environmental Program, coordinated by the department's regional director-general, Western and Northern Region, in Edmonton, Alberta, to augment the department's headquarters coordination functions for northern programs. Many of the department's research, information, regulatory and advisory functions of relevance to northern hydrocarbon development are coordinated through this program.

THE STRATEGY FOR ENCOURAGING SUSTAINABLE UTILIZATION OF THE NORTH'S RENEWABLE RESOURCES, SENSIBLE USE OF ITS NON-RENEWABLE RESOURCES, AND THE RESOLUTION OF TRANSBOUNDARY ENVIRONMENTAL ISSUES

89. In the strategy summarized above, the department's functions are focused on the industrial technology being applied to develop the North's natural resources. In this strategy, the same functions are focused on the natural resources themselves, and their use and management. The goal of the

strategy is to ensure that all DOE's roles are played effectively and efficiently in promoting sustainable or sensible use of the natural resources in achieving balanced northern development. The key elements of this strategy are the following. Environment Canada will --

- actively support and contribute to the land use planning processes being established in the North. This will be done by representing environmental interests in the planning forums, and by making recommendations on land uses and resource management practices. To be effective, approved land use plans must be consistent with federal and territorial government environmental policies, have wide acceptance among the affected parties, and provide a sound framework for northern resource and environmental management. DOE's horizontal powers and influence will be employed in working toward these ends;

- provide area-specific environmental guidelines and resource management criteria for northern regions. These guidelines and criteria, and the data sets and analyses on which they are based, are to be tailored for effective use in the preparation of land use plans and in the administration of resource and environmental regulatory systems operating in the North;

- promote and join in interjurisdictional studies of the Mackenzie and Yukon river systems to determine water shares, uses and management regimes that are fair to all jurisdictions and based on sound conservation concepts. The Canada Water Act provisions on comprehensive river basin planning enable such studies, and provide a framework under which endorsed study recommendations can be implemented through formal intergovernmental agreements;

- develop improved knowledge on the population dynamics and habitat requirements of migratory birds and other northern wildlife species of federal interest; regulate the harvesting of migratory bird species;

- undertake or promote research to improve the management and allocation of northern species -- particularly those that are rare, endangered or threatened in the North; promote, in conjunction with other responsible agencies, the adoption of formal interjurisdictional accords to protect and manage migratory species such as caribou, polar bears, seals, whales and anadromous fish, and their habitats;

- undertake research on the dynamics of fire, pests and diseases in northern forests; assess opportunities for making beneficial uses of the northern forests on an environmentally sound basis; and advance the knowledge of the role vegetation plays in northern ecosystems;

- undertake research on the environmental implications of utilizing alternative energy and mineral resources, and on the basis of the research findings, develop departmental positions on the development and use of the North's hydrocarbon and other non-renewable resources;

- join with other concerned jurisdictions, including those of other countries and international agencies, to identify and assess the effects of airborne pollutants on arctic and sub-arctic environments, and to promote the adoption of interjurisdictional agreements aimed at reducing air-pollutant levels; investigate the resource and socio-economic implications of long-term climatic change and variability;

- provide timely advice on the use and management of the North's lands, waters, forests and wildlife to the territorial water boards, land use advisory committees, and other bodies with resource management responsibilities in the North. This advice is aimed at ensuring that environmental factors are fully considered in granting water licences and land use permits, in setting game harvesting limits, and in establishing forestry and other resource management criteria.

THE STRATEGY FOR IMPROVING PUBLIC INFORMATION AND CONSULTATIONS ON NORTHERN ENVIRONMENTAL MANAGEMENT POLICIES AND PROGRAMS

90. Individual citizens and public interest groups play important roles in forging public perceptions on environmental issues and in influencing public policies. Many citizens and groups have become very knowledgeable and sophisticated in their campaigns and interventions. In the process, they have been making effective use of government-produced information and are demanding more. Information and dialogue are essential for effective public interest groups. At the same time, well informed and committed citizens and groups are essential to the successful implementation of many environmental policies and programs. Environment Canada has recognized this symbiotic relationship, and has formulated a strategy on public information and consultation. The goal for this strategy, as it relates to northern environmental management, is to ensure that interested Canadians -- particularly northerners -- have ready access to public information produced by DOE, and have opportunities for discussion on DOE's northern policies and programs. The elements of the strategy call for Environment Canada to --

- adhere to the commitments made in DOE's Policy on Public Consultation and Information Availability;

- improve the department's dissemination, particularly among northerners, of information on the state and trends of northern environmental quality and resource use;

- convene sessions on northern environmental topics at DOE's national and regional consultation meetings. Special efforts are to be made to increase the number of regional meetings held in northern communities;

- provide support for conferences, symposia, seminars, workshops and lectures on northern environmental issues, and encourage organizers to convene such meetings in the North, as well as at southern locations; make use of such meetings to provide DOE-produced information on the North, and to receive views of others on northern environmental matters;

- ensure that senior DOE officers with program responsibilities in the North establish and maintain effective communication links with appropriate officers of the territorial governments, native and other northern-based organizations, and federal government units located in the North as well as in the National Capital Region;

- increase DOE's presence in the North by establishing additional offices in the territories, and by locating more program personnel in the North -- particularly resident research and enforcement officers -- as finances and support facilities permit. The department has appointed an officer in Whitehorse to act as the DOE spokesman in the Yukon, and expects to make a similar appointment in Yellowknife shortly.

VI. CONCLUSION

91. Over the last decade important changes have occurred in the way environmental quality issues are perceived and approached. During the sixties and early seventies, the priority was to eliminate the gross, highly visible sources of pollution, exemplified by the dumping of raw sewage into our waterways and black soot on our cities. Attention was focused on what was coming out of the "end of the pipe."

92. While pollution from the end of the pipe still remains a concern, we have become aware of other more subtle and more complex problems that pose threats to ecosystems and human health: problems such as toxic substances and acid rain. It is much less easy to establish the cause-and-effect relationships in these problems; altogether, the issues have become much more difficult to understand and to resolve. We have learned, however, that an after-the-fact, curative approach to environmental problems is exceedingly difficult and very expensive to follow. Moreover, a cure is not always possible, so that environmental damage may lead to permanently impaired regional economies or ecosystems.

93. We are learning that the most effective and least expensive way of coping with environmental issues is to deal with them at the outset, before decisions are made that result in forms of activity and behaviour that leave us no other option than the curative or damage-repair course for resolving environmental problems. The preventive approach calls for acknowledgement of the values of the environment before it is damaged, and for the careful consideration of environmental factors in the early planning stages of all activities -- be it the development of a new product, the design of a settlement, or the construction of infrastructure for resource development projects. Such an approach is more demanding of the planning process, takes more time and money at the front end, but saves money in implementation and rehabilitation. It yields immeasurable dividends in environmental, social and economic benefits over the long term.

94. Canada's North presents an excellent opportunity to apply this positive approach to development. Despite the acceleration of the northern enterprise, most of the North is still wilderness; it has few seriously altered landscapes, and is unencumbered by massive accumulations of industrial infrastructure. The template that will set the forms and patterns of future northern development is still in the forge and it is still pliable. But not for long: change is taking place and the template is being shaped. Now is the time for action.

95. By careful planning we can still achieve balanced northern development -- development that is economically, socially and environmentally sound, and that yields maximum sustainable benefits for present and future generations of Canadians. However, to ensure this achievement, northern development planning must be holistic in approach and be carried forward through a concerted effort involving all those engaged in

the northern enterprise. In the process, we must never forget that in the North, harsh consequences can result for human endeavours and for ecosystems if basic man-environment relationships are ignored. All Canadians need to heed the approach suggested by the philosophies of the people who for centuries have successfully met the challenge of living in this land. In the words of one native leader in the Northwest Territories, this approach means

> living with the land, with the animals, with the birds and fish, as though they were your sisters and brothers. It means saying the land is an old friend and an old friend your father knew, your grandfather knew, indeed your people always have known.... Without our land we cannot -- we could no longer exist as people. If our land is destroyed, we too are destroyed.[20]

20. Quoted in Mr. Justice Thomas R. Berger, Northern Frontier, Northern Homeland: The Report of the Mackenzie Valley Pipeline Inquiry, 2 vols. (Ottawa: Supply and Services Canada, 1977), vol. 1, p. 94.

ANNEX A

A NOTE ON THE COURSE AND CHARACTER OF OCCUPANCY IN CANADA'S NORTH

The period of pre-European occupancy represents by far the largest proportion of man's total time and experience in the Canadian North. The aboriginal peoples have occupied the northern regions for perhaps 30,000 years or more. In contrast, the first European explorers ventured into Canada's North less than 1000 years ago, and the major northern thrusts of southern Canadian industrial interests commenced only during the last four decades.

From a purely environmental perspective, the forms of occupancy developed by the forefathers of Inuit and Indian Canadians had considerable merit. They were based on the utilization of renewable resources, placed virtually no demand on non-renewable energy sources, and did not generate toxic or non-degradable wastes. But they could only support small populations. From a modern-day humanistic viewpoint, the population regulators were harsh: starvation, sickness, accident, massacre, suicide and infanticide. Without applying the humanist's value judgement, however, it can be said that northern man and environment were in balance throughout the many centuries in which the pre-European cultures prevailed.[21]

With the arrival of European man in the North, came disruptions in the prevailing northern balance. Most of these disruptions were episodic in character -- events like the periodic decimation of native communities by foreign diseases, and the near destruction of the Beaufort Sea whale population by commercial whalers. One particularly notable event occurred at the close of the last century. Gold fever was its progenitor; the child was the Klondike Gold Rush of 1898. Its legends are legion -- stories of man's incredible endurance in his quest for material wealth. But the drama also demonstrates man's capacity to wreak havoc on himself and on local environments. The native population in the area was decimated; one tribe -- the Han -- virtually disappeared. And the local ecosystems were radically altered by the placer mining and related activities. Although primarily local in its direct impact, it was an indicator of one possible northern future.

Some of the other early impacts of European man were more general and profound in their effects. The introduction of the Europeans' technology and commercial economy offered the native communities new prospects. Native people were quick to adopt the technology, and responded with

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21. During this long period, there were changes in North America's ecosystems. Climate change and glaciation played major roles in these modifications, but some scientists believe early hunters also played a role in, for example, the extinction of several large mammals. Whether some of the changes in fauna were actually man-induced may never be known. What can be said is that the aboriginal societies became expert in devising survival techniques using technology that had a very limited capacity to bring on rapid, fundamental or irreversible change in ecological systems.

entrepreneurial skill to the commercial opportunities. But an alternate philosophy and value system came as well. Reconciling the alien philosophy with traditional beliefs and coping with foreign lifestyles and values presented a more formidable challenge to native communities.

The efforts of the Europeans to tap the North's resources and to integrate the region into a larger economy were continued by subsequent southern-based Canadian interests. However, up to only a few decades ago, the scale and success of these endeavours were limited. Their impacts left most of the northern expanse untouched, although their effects on particular places, wildlife species and native communities were at times dramatic.

The northern economy, partly subsistence, partly commercial, remained founded on hunting, fishing, trapping and gathering. Native people, having made an accommodation with trader, missionary, and government official, followed their traditional pursuits relatively undisturbed -- except for the continuing problem of coping with the white man's diseases and technologies. The major thrust to reap the North's resource potential had to await the accumulation of more scientific knowledge of the North, and the development of more-powerful technology.

The slow pace of the northern enterprise is indicated by the size of the human population. The population of Canada's North three-quarters of the way through the twentieth century was only 65,000 -- the 1976 population of a modest-sized southern Canadian city such as Peterborough, Ontario. Providing marked contrast is the settlement record of another large Canadian region -- the Canadian Prairies. This region was transformed from undisturbed natural grasslands to an agricultural domain with lightning speed. The story is succinctly told by population statistics. In just two decades, 1901-1921, the population of Saskatchewan and Alberta surged by 720 per cent -- from 164,000 to 1.3 million.[22]

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22. There are lessons to be learned from the dramatic settlement record in the Canadian Prairies. The rapid, almost frantic pace of prairie agricultural occupancy was the consequence of a carefully and deliberately set national policy. Its objective was to consolidate Canadian sovereignty from the Atlantic to the Pacific. In this, it was spectacularly successful. But the subsequent costs incurred by the rush of prairie development were high. Using hindsight, it can be seen that insufficient knowledge was available and little time was taken to assess the environmental viability of tillage agriculture in the Prairies' short-grass country; thousands of acres of these grasslands were put to the plough. The price was dearly paid in the 1930s. It is well known to Canadians: the social and economic havoc wrought by the prairie drought and dustbowl days of the 1930s. Farms were foreclosed and abandoned, and families were left destitute; municipalities went into trusteeship and the same fate threatened the three provincial governments. The remedy involved the massive infusion of federal funds, and the complete restructuring of land use and farming practices. And there were other consequences of prairie development that the nation cannot be proud of: the adverse effects on the welfare of the Indian

In broad-brush terms, the "big push" in the northern enterprise came only in the 1940s. World War II was the catalyst. With the war, scientific knowledge on the North and northern non-renewable resources assumed strategic importance. The war also stimulated rapid technological advances, particularly in transportation. Major engineering works were undertaken to meet military objectives. The Canol pipeline was built to transport oil from the Norman Wells oil fields in the Mackenzie Valley, and the Alaska Highway was constructed in rapid fashion.

Military concerns continued to stimulate new northern penetrations after the war. The realignment of the world's geopolitics gave additional strategic importance to the North. Moreover, the technology to provide quick access to all northern points was finally available in abundance; major northern penetrations were thus made possible. One consequence was the construction of the Distant Early Warning (DEW) Line in the 1950s. With this venture came bases, complete with southern-style accommodation and communication and transportation facilities, placed every fifty miles or so across Canada's arctic frontier. Major northern advances in both air and marine transport technology and services also come with the DEW Line.

At the same time, a perceived need to reassert Canadian sovereignty in the North, and an awareness of new technological prowess, stimulated interest in northern development generally. Northern scientific and mapping programs were accelerated, a network of northern meteorological stations was established, a "roads-to-resources" program was initiated, non-renewable resource exploration and development were encouraged, and well-intentioned health, welfare and education programs aimed at the northern natives were greatly expanded. The momentum of these and other northern development initiatives has carried on more or less unabated to the present time.

The results produced in this very recent chapter of the northern enterprise have been truly momentous. In a second on the historical time scale, a transformation in northern occupancy has been initiated that has no rival in Canada's northern history.

The impacts are dramatic. Northern places that up to only a few years ago served as trading posts, temporary hunting camps, military outposts or weather stations, now have permanent settlements -- settlements with housing standards and community services approaching those of southern towns; linked by scheduled jetliner service to regions beyond; having telephone connections with places a continent away; and enjoying "Hockey Night in Canada" on colour television sets. Dog teams and kamutiks have given way to snowmobiles, all-terrain vehicles and trucks; gas-powered canoes and boats have replaced kayaks and umiaks. Fresh fruit and vegetables, and goods displayed in southern department stores, are available in some settlement stores. In brief, the "southern way of living" and the associated expectations and standards have taken firm root in many parts of the North.

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and Métis people and the decimation of certain wildlife species. The episode demonstrates in stark fashion the enormous social and economic costs of ignoring climatic and other environmental factors, and it shows how sound environmental knowledge and management makes good economic sense. As the development of Canada's North proceeds, Canadians and their leaders need to keep these lessons very much in mind.

ANNEX B

A COMMENT ON THE FEDERAL GOVERNMENT'S APPROACH TO THE ADMINISTRATION OF ENVIRONMENTAL AFFAIRS

The federal government has recognized the omnibus nature and complexity of environmental affairs in approaching its constitutional responsibilities for the natural environment. In recognition of the importance of the environment to society and of the need to provide scientific expertise, leadership and government-wide coordination on these complex matters, the government has created the Department of the Environment. This was done in 1971 through the enactment of the Department of the Environment Act (Part I of the Government Organization Act, 1970, as amended by Part III of the Government Organization Act, 1979).

The government has also noted that numerous federal policies and programs can have impacts on man-environment relationships. To ensure that these impacts are identified and carefully considered, it has made all federal ministers and their departments and agencies responsible and accountable for the environmental consequences of their actions. This has been done by incorporating environmental provisions in acts of Parliament or in associated regulations that deal with a broad range of subjects. Other assignments and environmental policy directions have been provided through orders-in-council or Cabinet decisions. Examples of acts with environmental provisions, which are administered by departments other than DOE, include the Arctic Waters Pollution Prevention Act, Territorial Lands Act, Northern Inland Waters Act, Canada Shipping Act, Motor Vehicle Safety Act, National Energy Board Act, Oil and Gas Production and Conservation Act, Canada Oil and Gas Act, and Pest Control Products Act. Examples of environmental policy directives that are applicable to all federal departments include the Federal Policy on Inland Waters, the Federal Policy on Land Use and the Federal Land Management Principle.

The government has also introduced a comprehensive environmental impact assessment process. This process, called the Environmental Assessment and Review Process (EARP), was established in 1973. It is administered by an independent federal agency -- the Federal Environmental Assessment Review Office -- which reports directly to the Minister of the Environment. The purpose of EARP is to ensure that the environmental effects of federal projects, programs and activities are assessed in early planning stages, before any commitments or irrevocable decisions are made. Projects or activities with potentially significant environmental effects receive formal reviews, including public hearings, conducted by environmental assessment panels established by the Minister of the Environment. The process

supplements the more specialized environmental reviews called for under a number of acts and regulations; all federal departments are subject to EARP and must comply with its provisions.[23]

The projects, programs and activities that come under EARP are those initiated by federal departments or agencies, and projects proposed by bodies outside the federal government that involve federal funds or property. Since virtually all of the onshore and offshore areas in Canada's North are under federal jurisdiction, all proposals for northern projects are subject to EARP.

23. A description of EARP is given in Canada, Federal Environmental Assessment Review Office, Revised Guide to the Federal Environmental Assessment and Review Process (Ottawa: Supply and Services Canada, 1979).

ANNEX C

ACTS AND ORDINANCES THAT CONTAIN
ENVIRONMENTAL AND RESOURCE MANAGEMENT
PROVISIONS PERTINENT TO THE NORTH

Legislation	Administering Agencies[24]
FEDERAL STATUTES	
A. Federal Type:	
1. Arctic Waters Pollution Prevention Act	DIAND, EMR, DOT
2. Atomic Energy Control Act	AECB
3. Boundary Waters Treaty Act	DEA
4. Canada Oil and Gas Act	COGLA
5. Canada Shipping Act	DOT
6. Canada Water Act	DOE
7. Canada Wildlife Act	DOE
8. Clean Air Act	DOE

24. Agencies

AECB - Atomic Energy Control Board
COGLA - Canada Oil and Gas Lands Administration
DEA - Department of External Affairs
DFO - Department of Fisheries and Oceans
DIAND - Department of Indian Affairs and Northern Development
DOA - Department of Agriculture
DOE - Department of the Environment
DOT - Department of Transport
EMR - Department of Energy, Mines and Resources
GNWT - Government of the Northwest Territories
NEB - National Energy Board
NHW - Department of National Health and Welfare
NPA - Northern Pipeline Agency
YTG - Government of Yukon

Legislation	Administering Agencies
9. Coastal Fisheries Protection Act	DFO
10. Department of the Environment Act	DOE
11. Department of Fisheries and Oceans Act	DFO
12. Dominion Water Power Act	DIAND
13. Environmental Contaminants Act	DOE, NHW
14. Fisheries Act	DFO, DOE
15. Forestry Development and Research Act	DOE
16. Game Export Act	DOE
17. Historic Sites and Monuments Act	DOE
18. Indian Act	DIAND
19. International River Improvements Act	DOE
20. Migratory Birds Convention Act	DOE
21. National Energy Board Act	NEB
22. National Parks Act	DOE
23. Navigable Waters Protection Act	DOT
24. Northern Pipeline Act	NPA
25. Ocean Dumping Control Act	DOE
26. Oil and Gas Production and Conservation Act	DIAND, EMR
27. Public Lands Grants Act	DIAND
28. Seeds Act	DOA
29. Territorial Sea and Fishing Zones Act	DFO
30. Weather Modification Information Act	DOE
31. Whaling Convention Act	DFO

Legislation	Administering Agencies
B. Provincial Type:	
1. Department of Indian Affairs and Northern Development Act	DIAND
2. Northern Inland Waters Act	DIAND
3. Northwest Territories Act	DIAND, GNWT
4. Territorial Lands Act	DIAND
5. Yukon Act	DIAND, YTG
NORTHWEST TERRITORIES ORDINANCES	
1. Area Development Ordinance	GNWT
2. Commissioner's Land Ordinance	GNWT
3. Environmental Protection Ordinance	GNWT
4. Forest Protection Ordinance	DIAND
5. Historical Resources Ordinance	GNWT
6. Pesticide Ordinance	GNWT
7. Petroleum Products Ordinance	GNWT
8. Public Health Ordinance	NHW, GNWT
9. Scientists Ordinance	GNWT
10. Territorial Parks Ordinance	GNWT
11. Wildlife Ordinance	GNWT
YUKON TERRITORY ORDINANCES	
1. Area Development Ordinance	YTG
2. Forest Protection Ordinance	DIAND
3. Game Ordinance	YTG
4. Gasoline Handling Ordinance	YTG

Legislation	Administering Agencies
5. Historic Sites and Monuments Ordinance	YTG
6. Lands Ordinance	YTG
7. Parks Ordinance	YTG
8. Public Health Ordinance	NHW, YTG
9. Scientists and Explorers Ordinance	YTG

ANNEX D

A SUMMARY NOTE ON ENVIRONMENT CANADA'S MANDATES AND OBJECTIVES, AND DOE'S CONTRIBUTIONS TO NORTHERN DEVELOPMENT AND CONSERVATION

The Department of the Environment Act

The Department of the Environment was created in 1971 through the enactment of the Department of the Environment Act (Part I of the Government Organization Act, 1970 as amended by Part III of the Government Organization Act, 1979). The duties, powers and functions of the Minister of the Environment, as established by the act, extend to and include all matters over which Parliament has jurisdiction, which have not been otherwise assigned, relating to --

- the preservation and enhancement of the quality of the natural environment, including water, air and soil quality;
- renewable resources, including the forest resources of Canada, migratory birds and other non-domestic flora and fauna;
- water and meteorology;
- the enforcement of rules and regulations arising from the advice of the International Joint Commission relating to boundary waters and questions arising between the United States and Canada that relate to the preservation and enhancement of environmental quality;
- the coordination of the policies and programs of the Government of Canada respecting the preservation and enhancement of the quality of the natural environment;
- other federal matters relating to the environment which are assigned to the Minister.

The act empowers the Minister to --

- initiate, recommend and undertake programs, and coordinate programs of the Government of Canada that are designed --
  - (i) to promote the establishment or adoption of objectives or standards relating to environmental quality, or to control pollution;
  - (ii) to ensure that new federal projects, programs and activities are assessed early in the planning process for potential adverse effects on the quality of the natural environment and that a further review is carried out of those projects, programs, and activities that are found to have probable significant adverse effects, and that the results thereof are taken into account;

(iii) to provide Canadians with environmental information in the public interest.

- promote and encourage the institution of practices and conduct leading to the better preservation and enhancement of environmental quality, and cooperate with provincial governments or agencies thereof, or any bodies, organizations or persons, in any programs having similar objects;

- advise the heads of departments, boards and agencies of the Government of Canada on all matters pertaining to the preservation and enhancement of the quality of the natural environment.

The act also empowers the Minister, with the approval of the Governor-in-Council, to --

- establish environmental quality guidelines for use by federal departments, boards and agencies in exercising their powers and in carrying out their duties and functions;

- enter into agreements with the government of any province or any agency thereof respecting the carrying out of programs.

Other Acts Administered by the Minister of the Environment

Other acts administered by the Minister of the Environment include the --

- Canada Water Act
- Canada Wildlife Act
- Clean Air Act
- Environmental Contaminants Act
- Forestry Development and Research Act
- Game Export Act
- Historic Sites and Monuments Act
- International River Improvements Act
- Migratory Birds Convention Act
- National Parks Act
- Ocean Dumping Control Act
- Weather Modification Information Act

Environment Canada also has responsibility to administer pollution control provisions of the Fisheries Act and to provide specific advice under certain sections of federal legislation assigned to other departments, such as emissions provisions of the Motor Vehicle Safety Act.

Departmental Objectives

Governed by its legal mandates, the purpose of Environment Canada is to foster harmony between society and the environment for the economic, social and cultural benefit of present and future generations of Canadians.

To achieve this, the department pursues four objectives:

1. Ensure that human activities are conducted in a way that will achieve and maintain a state of the environment necessary for the health and

well-being of man, the health and diversity of species and of ecosystems, and the sustained use of natural resources for social and economic benefit.

2. Conserve and enhance Canada's renewable resources of water, land, forests and wildlife and their related ecosystems and promote their wise use in a sustainable manner for economic and social benefit.

3. Facilitate the adaptation of human activities to the environment.

4. Protect for all time those places that are significant examples of Canada's natural and cultural heritage and encourage public understanding, appreciation and enjoyment of this heritage in ways that leave it unimpaired for future generations.

DOE's Contributions to Northern Development and Conservation

Some of the government agencies that were brought together in 1971 to create Environment Canada have long experience in northern operations and have made significant contributions to development and conservation efforts in the North. Under various names, the Canadian Wildlife Service (CWS) has been conducting wildlife research in the North since the early 1900s. It has made important contributions to the knowledge of northern species and their ecosystems. CWS has also been instrumental in negotiating treaties and agreements for the protection and management of northern species, and in implementing other northern wildlife conservation measures, including the establishment of thirteen migratory bird sanctuaries north of 60°.

The federal meteorological service, now called the Atmospheric Environment Service (AES) of the Department of the Environment, has been providing weather information to support northern transportation and development operations for approximately forty years. To obtain this information, AES currently operates twenty-one weather stations in the North, having a total complement of about 100 employees. In some instances, federal meteorological personnel and installations were the first to be located at particular northern sites. One such site is Resolute Bay on Cornwallis Island -- now an important northern terminal -- where a weather station was established in 1947. Another is on Ellesmere Island at Alert Bay -- Canada's most northerly settlement -- where a station was established in 1949. In addition to serving their primary objectives, these stations also provide communications and other logistical support to some northern communities, and serve as bases for scientific and industrial operations in the North.

Parks Canada has been very active in the North over the last twenty years. Its efforts led to the creation of three new national park reserves north of 60° in the early 1970s. More recently, it was instrumental in obtaining three land withdrawals through orders-in-council to create three more national parks, one each in the northern Yukon, along the East Arm of Great Slave Lake, and on Ellesmere Island. Parks Canada planning for the establishment of the additional parks needed to provide full representation of the North's natural regions is well advanced.

The Canadian Forestry Service and DOE's Inland Waters and Lands directorates are also active in the North. They conduct research on northern forest, freshwater and land characteristics, and on associated resource use and management issues. They also produce environmental baseline data, formulate resource management criteria and provide advice to federal and territorial resource management agencies.

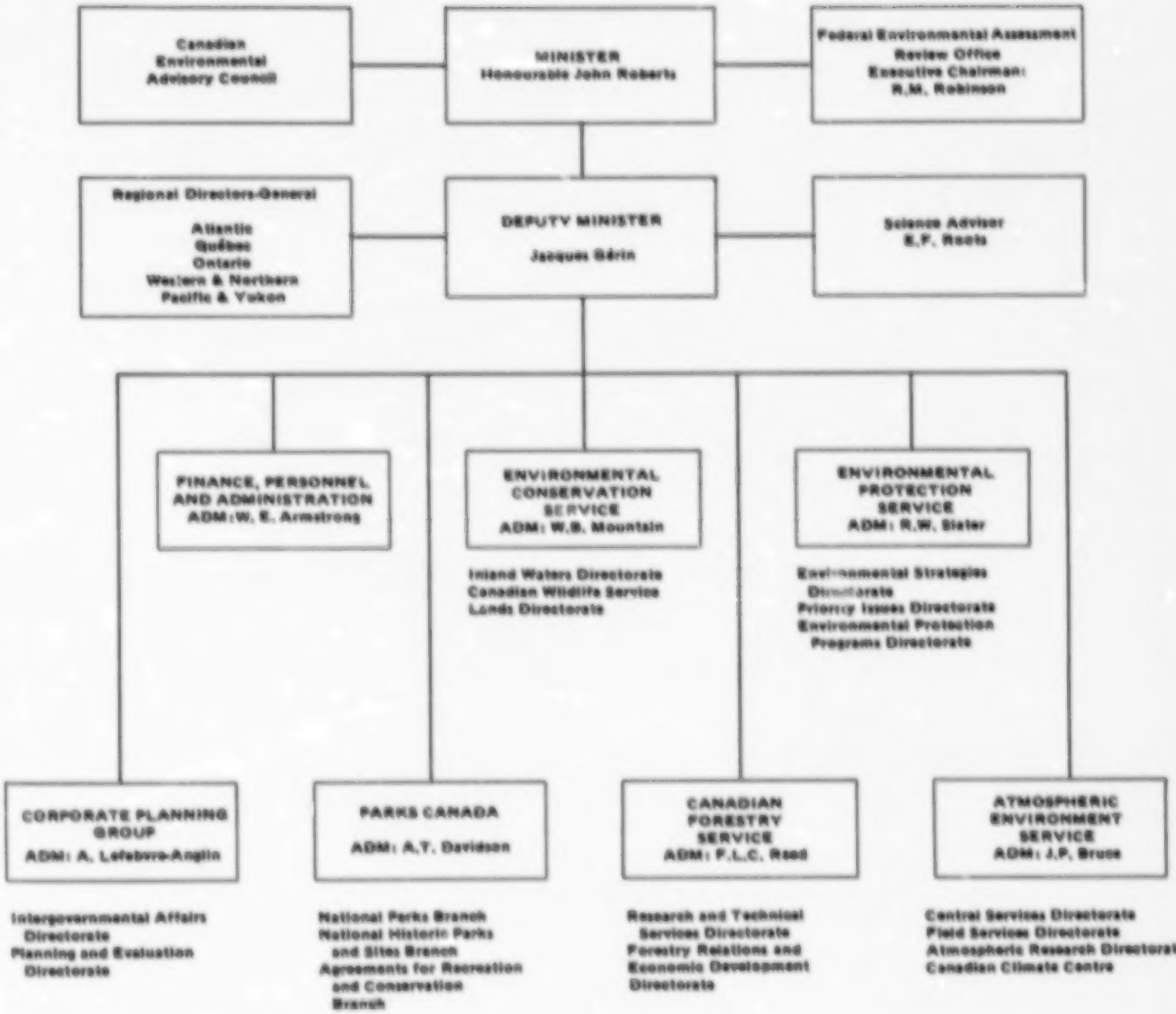
DOE's Environmental Protection Service (EPS) operates several offices in the territories from which the enforcement of pollution abatement regulations is administered. EPS also undertakes research on water and waste management systems and on oil spill containment and clean-up measures; these research activities are highly relevant to arctic and sub-arctic conditions and several of the research projects are northern-based. EPS is also involved in the development and coordination of plans to deal with environmental emergencies and programs dealing with the management of toxic substances.

Finally, the department has led in the development of a number of federal government policies and strategies that are pertinent to northern development -- for example, the Federal Policy on Land Use, the Federal Policy on Inland Waters and the Forest Sector Strategy for Canada. DOE's own policies are also relevant -- for example, the Parks Canada Policy and the Environmental Quality Policy. Currently, work is underway in the department on other policy initiatives that will have an influence on northern development. These include the development of a DOE policy on renewable resources conservation; a departmental policy regarding human adaptation to the natural environment (notably climate); departmental strategies on the maintenance of the land resource base and on wildlife habitat protection; and a federal strategy on water resources.

The overall direction for the development of these policies, and for program planning and coordination, is provided by the department's Corporate Planning Group (CPG) and its Senior Management Committee (SMC). The SMC is chaired by the deputy minister and comprises the assistant deputy ministers and the regional directors-general. The following organization chart is designed to serve as a guide to DOE's administrative structure.

ORGANIZATION CHART

ENVIRONMENT CANADA



ANNEX E

A COMMENT ON THE EVOLUTION OF RESOURCE USE POLICY IN CANADA'S NORTH

It is worth noting that before World War II, priority was given to traditional forms of northern occupancy in large areas of the North. However, the prime reasons for this were not entirely due to concern for native welfare and northern environmental quality. Issues of Canadian sovereignty were the principal concerns. Both the native people and the environment were used as important elements in formulating strategies to advance Canada's jurisdictional claims in the Arctic.

For example, at the turn of the century Otto Sverdrup discovered Axel Heiberg and Ellef Ringnes islands and claimed them for Norway. In response, Canada reasserted her claim to the islands of the High Arctic. To confirm this claim, Canada created a game preserve in the Arctic Islands in 1926, and stated that the hunting grounds of the Arctic should be preserved for the native Eskimoes (Inuit). Various additions were made to the preserve up until 1945, at which time over 1.3 million square kilometres (over half a million square miles) were set aside covering all the Arctic Islands and a large part of the rest of the Northwest Territories. To further entrench the sovereignty claim, the government relocated Inuit people from northern Québec to the Arctic Islands in the mid-1950s.

The policy stipulating wildlife and native occupancy as the priority uses of this very large area held until alternative uses came to light. After World War II, new resource use alternatives were emerging and a process began that led to the dismantling of the Arctic Islands Preserve. Subsequently, most of the former preserve area was opened to other forms of resource use.

ANNEX F

DETAIL ON ENVIRONMENT CANADA'S POSITIONS REGARDING LAND USE PLANNING, PROTECTED AREA PLANNING, THE REGULATION OF INDUSTRIAL ACTIVITY AND SCIENTIFIC RESEARCH IN THE NORTH

NORTHERN LAND USE PLANNING

In 1981, the federal Cabinet directed that land use planning systems be designed and implemented in the North. Of all the northern planning initiatives taken thus far, this one offers the greatest potential for ensuring wise development in the North. However, if the initiative is to reach its full potential, certain conditions must be met.

It is Environment Canada's position that the northern land use planning systems must meet the following criteria if they are to provide an effective guide for northern development. They must --

- Adopt comprehensive definitions of land and land use: "Northern land" must not be defined in a restrictive sense to mean only soil, terrain or a marketable commodity. It needs to be viewed as the total ensemble that nature presents from place to place, including freshwater and marine areas, as well as terrestrial. It embraces weather and climate; fresh and marine waters; bedrock geology, landforms and soils; terrestrial and aquatic plants, animals and micro-organisms; and the physical and biological processes that link these components. So defined, land is both the sustenance of life and the stage upon which life unfolds. The definition of "land use" also needs to be very inclusive. It can be defined simply to mean all human activities that make demands on the land in the sense defined above. But while land use is concerned with human activities, it is important to ensure that the considerations of the land use planning processes not be limited only to human demands on land. They must also consider the demands of the land itself (i.e., the requirements of ecosystems).

- Be linked to comprehensive regional planning: Regional planning is a process that addresses the social and economic concerns and aspirations of a region's people and institutions within the larger society. It focuses on the selection of socio-economic goals for the region and on the formulation and implementation of development strategies to achieve the goals selected. Land use planning should be viewed as a component of this larger planning process. Achievement of a region's goals inevitably places demands on land. The principal object of land use planning is to identify patterns and sequences of land use that best accommodate the regional goals without diminishing or destroying the land's capability to meet man's demands on land over the long term. In the land use planning process, consideration must be given to the socio-economic goals and strategies that have been selected for a region, and to such factors or attributes as the natural qualities of

land in particular places, the intensity of use, tenure, improvements, technology, and land management criteria. Through land use planning, geographical expression can be given to the regional development strategies. The process provides a spatial framework or structural plan that, when approved and widely accepted, can guide land use activities in the effective implementation of the strategies.

- Provide for the participation of affected individuals and groups: Arriving at sound land use decisions involves consideration of numerous and often conflicting interests. It usually requires the development of compromises. Formulating workable compromises is a delicate matter, for significant social and cultural values and huge investments can be at stake. To be effective, the planning process must be credible and, just as important, it must be seen to be credible in the eyes of the many individuals and groups that will be affected by the decisions. The best means to achieve this credibility is to enable those with interests at stake to be heard and to participate in the planning process. To ensure achievement of this end, the administration for the land use planning systems should be northern-based and readily accessible. The territorial governments should be partners in the planning process with the concerned federal bodies. And native groups and other northerners should sit at the planning table and contribute to decision-making along with others that have interests in the North.

- Have a scientific information base: The preparation of land use plans must be based on sound information if the plans are to reflect reality. Much of the necessary information will be available from those citizens and groups with long experience in northern regions. However, other necessary information can only be acquired through scientific investigations -- information on land use demands and potentials for traditional and present activities, but also for activities and technologies foreseen in the future. Resource inventories and assessments, technology assessments, knowledge of environmental dynamics and current land use, and socio-economic analyses must be provided. The land use planning administrators must ensure that information essential to the land use planning projects is representative, accurate, based on extended observation, and forthcoming on a timely basis. This requires considerable advance administrative planning among many organizations.

- Have continuity in their administrative systems: All land use plans reflect the conditions and value judgements existing at the time when they are prepared. But conditions and values change. An effective land use planning process must, therefore, not only provide for the monitoring of plan implementation. It must also be capable of detecting changes in circumstances, and of assessing the implications of these changes for the land use plans. In brief, it must have provisions for plan review and revision. The planning process is just as important as the plan. To be effective, the process must be directed by an administrative body that has continuity.

- Have an adequate mandate: The administrative body established in each territory to manage land use planning should have a mandate to --

  - undertake a process of land use planning whose object is to promote orderly and sustainable development compatible with regional and national interests, environmental objectives, and the social and economic well-being of northern residents;

  - establish a system for determining land use patterns that best accommodate the socio-economic goals, strategies and priorities set for each northern region, while maintaining the capacity of the land to meet the needs of future generations;

  - establish a public consultation process that enables all interested parties to participate effectively in the preparation, review and revision of land use plans;

  - prepare land use plans that reflect regional socio-economic goals and strategies, provide a clear spatial framework for directing land use activities, and supply management criteria to guide the administration of resource and environmental regulations;

  - recommend land use plans to the appropriate elected officials for approval, and monitor the implementation of approved plans;[25]

  - design and manage a system for handling appeals to depart from approved plans;

  - review and recommend amendments to the land use plans as circumstances warrant;

  - coordinate the activities of federal and territorial government departments and agencies with respect to the production of scientific and socio-economic analyses and information required in the land use planning process;

  - make recommendations on changes in law, policy or programs deemed necessary to improve the effectiveness or efficiency of the land use planning process.

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25. Under present legislative and administrative arrangements, the authority to approve northern land use plans encompassing areas beyond those under the jurisdiction of the territorial governments rests with the federal Cabinet. The Minister of Indian Affairs and Northern Development is responsible for seeking Cabinet's approval of these plans.

PROTECTED-AREA PLANNING

Planning to protect significant ecological, cultural and recreational areas is an important dimension that must be recognized in the northern land use planning processes. It involves consideration of a diverse range of land uses: national parks, national marine parks, national historical parks and sites, migratory bird sanctuaries, national wildlife areas, territorial game preserves, reserves and sanctuaries, Canadian landmarks, cooperative heritage areas, Canadian heritage rivers and trails, territorial parks, and archaeological sites.

Much remains to be done to complete the formal area designations and to prepare the management regimes required to protect these significant natural and cultural areas. For example, the systems of national parks and national marine parks are incomplete in the North; the first national wildlife area in the North is only now in the process of being established; and the program to establish territorial parks is in its infancy.[26]

The level of protection and management required to meet the many objectives and concerns varies considerably. Satisfying some objectives requires the provision of absolute protection through exclusive land use designations. But others can be met with much lower levels of protection, thus permitting other resource uses in many protected areas. Moreover, it is not necessary to protect all the areas that are suitable for satisfying specific conservation objectives. In some cases, the protection and

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26. In Canada's North, 140 sites have been identified as having ecological significance by the International Biological Programme (IBP). The total area of those IBP sites that are located outside the currently designated conservation areas and, consequently, have no special protection, is 2.8 million hectares, or 0.7 per cent of combined area of the two territories.

    It is worth noting that only 7.5 per cent of the total land and freshwater area in the Yukon and Northwest Territories is currently protected for conservation or recreation purposes: national park reserves (1.7 per cent); migratory bird sanctuaries (2.7 per cent); territorial government parks or park reserves, game reserves, and sanctuaries (3.1 per cent). The level of protection offered varies considerably depending on the form of designation. Areas designated under the National Parks Act offer the greatest protection. Most of the other types of area protection permit certain development activities under specific conditions.

    In contrast is the case of Alaska where areas with some form of conservation designation under federal legislation comprise about 30 per cent of the state; national parks alone account for about 12 per cent of the state area. As in Canada, not all areas are protected absolutely. The degree of protection depends on the type of designation and varies widely. Included are the areas dedicated under the National Wildlife Refuge, National Park, National Wild and Scenic Rivers, National Forest, and National Trail systems in place in the United States.

appropriate management of a relatively small number of representative areas is sufficient. And in certain instances, it is feasible to respond to two or more of the objectives at one site or area through appropriate designation and management.

The aim of protected-area designation is to ensure that reasonable levels of protection and management are provided for those areas and sites that are truly significant and critical to the achievement of conservation objectives, and for which no better substitutes exist. Such areas constitute a relatively small portion of the North. Designating non-essential areas for high levels of protection would be undesirable. The opportunity costs in benefits lost by precluding other land uses could be great and unjustified.

It is Environment Canada's position that a comprehensive planning framework, embracing all the relevant conservation and recreation objectives and demands, should be developed for the North. Through the preparation of this framework, all demands for area protection can be identified and correlated. This would permit all essential needs for area-protection to be ascertained, and at the same time would ensure that unnecessary protection measures are avoided. The development of the planning framework would require coordinated action by all those agencies responsible for protected-area programs. Each agency would have to prepare an inventory of the northern areas and sites of relevance to its program objects, and be prepared to share this information in consultations with other involved agencies. These inventories would serve as the basis for developing the planning framework. Provision should be made for public participation in the preparation of the framework, as well as for updating the framework as new information becomes available.

The advantages offered by this approach are several. It would --

- foster better coordination among those agencies that operate protected-area programs;
- provide a basis for assessing the adequacy of present legislation and administration concerning northern conservation area programs;
- provide industry, environmental groups and others with a comprehensive picture of all area-protection measures in place and being proposed, and would thereby reduce the uncertainty concerning northern conservation and recreation-area demands;
- provide a powerful tool for explaining and advocating conservation and recreation area proposals in the northern land use planning processes.

REGULATING INDUSTRIAL ACTIVITY IN THE NORTH

The application of industrial technology in the North has placed the regulatory systems under stress. Frequently, state-of-the-art technology is involved. With new technology come risks and uncertainties for both developers and regulators. Often, there is no previous experience to rely upon in making decisions on the acceptability of industrial proposals from short- and long-term engineering, safety and environmental perspectives. In such situations, delays and additional costs can result for all involved in the regulatory processes.

It would be irresponsible in terms of the public interest to give carte blanche approval to major development activities without first ascertaining the potential environmental and social consequences. On the other hand, it is unrealistic to expect developers to specify all the details of project designs and their probable environmental effects without the benefit of having tested the designs and associated technology in northern environments. In these situations both developers and regulators have no recourse but to learn by doing. This learning, however, should be done cautiously, and step by step, with provisions for review at each step as the development proceeds.

It is Environment Canada's view that action on a number of administrative and scientific issues could reduce the stress on the environmental regulatory processes and increase their effectiveness and efficiency. The intent in outlining these proposals is to stimulate discussion amongst the concerned public- and private-sector organizations on ways and means to improve the regulatory processes governing industrial activity in the North.

Administrative Matters

On the administrative side, it is Environment Canada's position that a clear distinction should be made between major and minor development projects in designing and administering regulatory systems. From an environmental perspective, major project proposals are those whose initial environmental evaluations indicate that significant environmental effects could result from project implementation.[27] Generally speaking, these projects are ones that --

- involve new technology or technology as yet untried in northern environments, and whose environmental effects are unknown or uncertain; or
- involve technology whose potential environmental effects on northern environments are known, and which can cause significant environmental damage unless carefully managed; and
- are complex and large in scale, and will impact on several distinct ecosystems or environmentally significant areas.

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27. Initial environmental evaluations (IEEs) are called for in the federal Environmental Assessment and Review Process (EARP) as part of the project screening process.

Minor projects are those that the EARP screening process finds will have no significant environmental effects as a result of project implementation. The projects are usually small in scale, involve well-tested technology, affect few ecosystems, and are reasonably simple to manage.

In the case of minor projects, applications to proceed should be processed quickly by regulatory agencies, using straight-forward and easily understood procedures that do not place heavy demands on project proponents for environmental information or research. It is to be recognized, however, that while minor projects have relatively small or insignificant environmental effects individually, collectively they may produce significant environmental damage through small but numerous incremental changes. The most effective way to prevent this, without placing unreasonable demands on small industries and local enterprises, is to have an approved land use plan in place. A well-conceived land use plan will reflect consideration of the cumulative and synergistic environmental effects of development activities. Adherence to the plan will enable each separate activity to be put in place quickly within a rational context for regional development.

Proposals for major development projects pose a more complex situation. It is Environment Canada's position that the concept of approval-in-principle should be applied as an important benchmark in dealing with these complex undertakings. A number of distinct requirements should be met before approval-in-principle is granted for a major project. Such approval should not be granted until --

- a land use plan is available for the region(s) to be affected by a proposed project;

- the project's proponent has submitted a concept plan for the proposed development and a statement on its potential environmenal and social effects to the appropriate government agency. The preparation of the statement on potential effects should be based on guidelines provided by government -- guidelines formulated on the basis of public hearings;

- a formal review, including public hearings, is completed to assess the potential environmental and social implications of the proposed project. The proponent's concept plan, the statement of potential effects, the land use plan, and statements on relevant national and regional development policies should serve as the basic reference materials for this review. The focus of attention in the review should be on the broad economic, social and environmental implications, as opposed to the detailed technical aspects of project designs and operations;

- recommendations arising out of the formal review are submitted to the appropriate elected official or body.

In the case of major projects found to be in the public interest and granted approval-in-principle by the appropriate elected official or executive body of government, a number of steps should be followed in bringing the project to an operational state:

- A general implementation plan should be developed that sets out in sequential fashion, the requirements that must be met by both the proponent and government in proceeding with project implementation. Responsibility for leading and coordinating the preparation of this plan should rest with the government agency having the principal regulatory responsibilities that pertain to the project;

- A senior project coordinator should be appointed by government to serve as the principal government contact for the project proponent, and to ensure that the implementation plan is acted upon expeditiously. The coordinator should have direct access to the deputy ministers of departments that have major roles in the implementation plan;

- A coordinated regulatory regime that proceeds from the general to the particular should be employed in regulating project implementation. This would involve the granting of specific approvals in incremental steps as the elements of the project design and operational specifications are finalized by the proponent.

The process followed in finalizing the detailed project designs and operational plans, and in granting the necessary approvals, should include --

- the specification by the proponent of the types of technology to be applied, their purpose and the areas in which they will be used;

- the specification by the responsible government agencies of the social and environmental baseline data required for detailed assessment and monitoring of the various components of the project;

- the provision of the required baseline data by the proponent and, where appropriate, by government's core and special data collection programs;

- studies by the proponent to test the suitability of technical systems. These studies should be designed jointly with the relevant regulatory authorities. These same authorities should monitor the studies and evaluate the results. The knowledge gained should be used by regulators in developing the terms and conditions to be used in regulating the project;

- the design of environmental mitigation measures to offset or minimize adverse environmental effects, and the preparation of contingency plans to deal with environmental emergencies. This should be done by the proponent, but subject to review and approval by the appropriate regulatory authority. When approved, these designs and plans should be incorporated in the project's operational plan;

- the design of surveillance systems to ensure compliance with environmental regulations. This should be done by the relevant regulatory authority with the cooperation of the proponent.

After the regulatory requirements concerning the planning and construction phases have been met and the project is at the operational stage, two additional factors need to be acted upon: compliance monitoring (surveillance) and environmental monitoring.

Surveillance to ensure compliance with all regulatory requirements involves four distinct functions: recording, reporting, verification and enforcement. The proponent (industry) is responsible for recording and reporting the data on waste discharges and on other matters called for in regulations. The data verification and regulation enforcement functions are the responsibility of government. The costs of routine government surveillance services are borne by normal departmental budgets. However, in the case of some major projects, extraordinary costs are incurred in providing government verification and enforcement services. In these instances, industry is charged these extraordinary costs.

Environmental monitoring is required to detect changes in the environment and to judge the adequacy of the terms and conditions specified in regulatory permits. Responsibility for the design of environmental monitoring systems rests with government. It is essential that these systems be in place when project operations commence.

Scientific Matters

The scientific issues of concern in regulating industrial activity in the North focus on methodological problems in assessing environmental impacts and in formulating management procedures. It is Environment Canada's position that a greater research and development effort is required on a number of scientific and technical matters, including --

- the definition, collection and analysis of environmental baseline data appropriate for establishing effective benchmarks on environmental conditions and for determining rates of change, degrees of environmental sensitivity, chains of causation, and periods of recovery;
- the development of better measures to define the "level of significance" that it is appropriate to attach to specific environmental impacts;
- the design of environmental monitoring and surveillance systems that produce effective information and are financially feasible to operate;
- the design of better mitigation technology and measures for use in minimizing adverse environmental effects;
- the development of effective contingency plans to contain environmental emergencies;
- the incorporation of strong environmental design components in the development of new technology in order to ensure environmentally appropriate technology, and to contribute to the safety, reliability and efficiency of operations.

SUPPORT FOR NORTHERN SCIENCE

The effectiveness of land use planning and environmental regulatory processes -- indeed, of northern development planning generally -- is vitally dependent on the timely availability of science-based information. This information can only be produced through research and related data acquisition programs conducted by governments, universities, industry and other private-sector organizations.

There has been a relative decline in the in-house environmental research and data generation programs of federal science-oriented departments. There is also concern about the state of university research and training capability in the environmental sciences. The reasons for the general erosion in the government and university science programs are complex; one of the most significant factors has been the impact of inflation.

In order to meet the need for much more comprehensive and detailed environmental information that has arisen as a result of the increased pace of northern development, and to balance the major strides being made by industry in environmental research -- advances which in themselves are most encouraging -- action is required to strengthen the environmental science efforts of both government and the universities.

It is Environment Canada's position that --

- changes in several government administrative policies (e.g., the contracting-out policy), and additional and sustained funding are required to permit a higher level of research on northern environmental matters in the programs of federal science departments;

- a high priority should be placed on northern environmental science by the government's research councils in granting funds for university research;

- coordination should be improved among universities with northern research and training programs, and between the universities and the government departments that operate northern research programs;

- a more concerted effort involving government, universities and industry is needed to strengthen and to ensure the continuity of a well-trained scientific and technical cadre capable of undertaking northern environmental research;

- research priorities should be focused on the determination of the carrying capacities of exploited northern ecosystems; the development of more effective means to assess environmental impacts; the design of better environmental monitoring systems; and the application of environmental design procedures in the development of technology intended for northern use;

- priorities for environmental data acquisition programs should focus on the development of comprehensive data sets structured to meet the needs of the land use planning and regulatory processes, as well as to support the priority research activities;

- a priority should also be placed on developing more efficient and effective information systems for collating and disseminating research findings and environmental data; greater efforts are needed to adopt advanced information systems in meeting this priority;

- all agencies engaged in northern research and data collection programs should place a priority on the active recruitment and training of interested northerners, particularly native people, with the objective of supporting the creation and maintenance of a strong northern-based science community;

- a priority should be established for the creation of strong northern-based science institutions independent of direction from the federal government or industry, and capable of conducting sound research on northern issues as defined by northern residents and their institutions. These issues will in many cases be identified and expressed through participation by northerners in the development of regional and local land use plans.

ANNEX G

A NOTE ON POLICIES GOVERNING THE PROVISION OF CORE AND SPECIAL SERVICES BY THE FEDERAL GOVERNMENT

Core government services are defined as those that produce goods, services or information for the public generally. The costs of core services are covered through normal departmental appropriations provided by Parliament. Special services are those that are not supplied to the general public; they are designed to provide goods, services or information required by particular clients. The costs of providing special services are charged to the users of these services.

The government operates a number of core programs that provide a range of research, data generation and regulatory services which are pertinent to environmental and resource management in the North. However, the core programs generally do not provide a level of service, or information on specific locales and development possibilities, at the level of detail required in the planning or regulation of individual resource development projects. Where it is not feasible to have private-sector interests produce the knowledge, data or service needed for particular resource projects, the government will, at the user's cost, undertake special programs to meet the requirements.

In the case of resource development projects north of 60°, the federal Cabinet has provided specific guidelines that define the financial responsibilities of both government and industry with respect to the regulation of these projects. The principal elements of the guidelines are as follows:

1. Through its core programs, government is responsible for bearing the costs of --

   . past and on-going baseline studies;
   . administrative review;
   . routine government surveillance;
   . monitoring.

2. Industry is responsible for bearing the costs of --

   . studies, specific to an individual project, which are conducted by government as a special service;

   . provision of information that industry is required to supply to the responsible department for its environmental impact statements for EARP, including costs of research that industry must buy from government if not available elsewhere;

   . inspection and reporting by industry to comply with government surveillance requirements;

. studies specific to a class of similar projects;

. extraordinary costs of government surveillance.

3. Government and industry are to share the cost of accelerated baseline studies, the incremental costs caused by acceleration being charged to industry.

These guidelines were issued in 1977. More recently, the government has established an Environmental Studies Revolving Fund to finance environmental studies concerning oil and gas operations on Canada Lands.[28] The fund, created under the Canada Oil and Gas Act (in force March 1982), is to become operational in 1983. Its revenues are to come from levies on companies that hold oil or gas leases on Canada Lands. For administrative purposes, the fund is divided into two components -- one covering the Yukon and Northwest Territories, and the northern offshore areas; the other covering the Canada Lands in southern Canada. Responsibility for the administration of the northern component of the fund rests with DIAND. The southern component is managed by the Canada Oil and Gas Lands Administration (COGLA). An advisory board, comprising government agencies (including DOE) and industry representatives, has been established to assist the managers of the fund. The studies to be supported by the fund are those required to deal with environmental issues directly associated with the exploration, production and transportation of oil and gas on Canada Lands.

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28. Canada Lands are those areas of the country that are under federal jurisdiction. They comprise almost twice the area of the ten provinces combined, and include the area off Canada's coasts, the Yukon and Northwest Territories, and small areas scattered throughout the provinces.